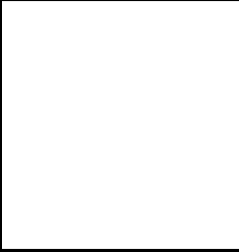


Chapter 2

Alternatives



2.0 Alternatives

- Seven alternatives were developed to respond to issues identified in Chapter 1.
- Alternatives address salvage within the fire perimeter and restoration projects throughout the LSR.
- Includes a brief description of proposed salvage and restoration projects.
- Alternative G is the BLM's Preferred Alternative.
- Describes how alternatives were developed and the range of alternatives.
- Table 2-1 compares the alternative in table format.
- Table 2-2 summarizes the effects of the alternatives.
- Table 2-3 summarizes cumulative effects.

2.1 Introduction

Seven alternatives were developed to provide different responses to the issues identified in Chapter 1. A no action alternative (Alternative A) was included. Alternative G is identified as the BLM's Preferred Alternative. In the Final EIS, the Preferred Alternative may be modified or another alternative selected as the Preferred Alternative based upon public comment received on this Draft EIS.

The action alternatives contain two major categories of proposed projects:

1. Salvage within the fire perimeter (Alternatives C-G).
2. Restoration projects located throughout the Elk Creek Watershed (Alternatives B-G).

Maps illustrating the proposals by alternative are attached. Table 2-1 documents the salvage and restoration proposals by alternative in a comparative format. Table 2-2 is a comparison of the major effects that would occur if any of the alternatives were implemented. Table 2-3 summarizes the cumulative effects analyses presented in Chapter 3.

2.2 Alternative Design

The alternatives presented in this Draft EIS were developed using an interdisciplinary process including managerial input.

Questions revolved around four major issues:

1. Should the BLM propose economic recovery of fire-killed trees (salvage) within the area affected by the Timbered Rock Fire?
2. If so, what level of salvage would be appropriate considering cumulative effects and land use allocations

within the watershed?

3. If salvage is to be analyzed, why not evaluate restoration projects throughout the LSR?
4. What level of restoration is appropriate?

Preliminary review of the NFP, RMP, WA, and LSRA determined salvage is consistent with management direction or recommendations found in those documents. Subsequently, a decision was made to proceed with an analysis of salvage and to include late-successional forest restoration recommendations contained in the WA and LSRA. Cumulative effects would be analyzed in the environmental analysis.

A review of scientific literature, court decisions, management direction/recommendations, discussions among team members, and comments from the public revealed that levels of snags and coarse woody debris (CWD) were critical issues regarding salvage and management of LSRs. The interdisciplinary team decided to formulate salvage alternatives around these concerns which also had a direct effect on recoverability of fire-killed trees. Projects designed to restore late-successional forest conditions would be developed from recommendations in the previously prepared WA or LSRA or developed during preparation of this EIS.

2.3 Proposed Project Descriptions

Following is a brief description of proposed projects. Salvage is described in Appendix D. Restoration projects are described in Appendix E. Project locations are shown on project maps and on alternative maps.

2.3.1 Salvage Proposals

Two types of salvage, area and roadside, are discussed. Alternatives A and B propose no salvage. Salvage within Alternatives C - G would obtain some level of economic recovery. Each salvage alternative was designed using specific guidance relating to post-fire salvage and/or Late-Successional Reserve guidelines. Description of this guidance is included in the alternative descriptions. Research could be considered within each of the salvage alternatives. Alternative G is designed specifically to study the effects of various snag retention levels on wildlife species.

Project Proposals

Salvage

- Area Salvage
 - Salvage Research Proposal
 - Roadside Salvage

Restoration

- Fish Habitat Improvement
 - Culvert Replacement
 - Fish Structures
- Vegetation Treatments
 - Late-Successional Habitat Restoration
 - Pine Habitat Restoration
 - Riparian Habitat Restoration
 - Oak Woodland and Meadow Restoration
- Noxious Weed Treatment
- Reforestation
 - Reforestation Research Proposal
- Fuels Treatments
 - Fuel Management Zones
 - Fuel Hazard Reduction
- Wildlife Projects
 - Eagle Habitat Improvement
 - Denning Habitat Project
- Road Projects
 - Road Reconstruction
 - Road Stream-crossing Upgrades
 - Road Maintenance
 - Road Decommissioning
 - Seasonal Road Closures
- Pump Chance Reconstruction
- Rock Quarry Closure and Rehabilitation

Acres of salvage vary by alternative and an array of snag and coarse woody debris (CWD) levels are considered. Harvest methods vary within each alternative. Treated acres and harvest method acres are provided within each alternative description.

The salvage proposal would not include harvesting of green trees but an occasional green tree may be cut to facilitate logging. These trees may be needed for guy lines for cable yarding systems. Green trees may also be cut to clear for yarding corridors or landings. These trees would be harvested. Any green trees cut in Riparian Reserves or within ¼ mile of active owl sites would be left for CWD.

It is anticipated most fire-killed trees in 8-16 inch DBH size classes would deteriorate and would no longer have commercial value. These trees would provide additional snags and CWD.

Salvage of roadside hazard trees is included in all salvage alternatives (Alternatives C–G). The goal is to recover the

economic value of trees that have been identified as hazards to users within the fire area. Regardless of the alternative, trees identified as hazards would be felled.

2.3.1.1 Area Salvage

Area salvage is proposed on BLM-administered lands within the Timbered Rock Fire perimeter where trees were killed by the fire. Only trees which are considered dead would be salvaged. The location and amount of salvage being considered varies by alternative. Harvest systems in all alternatives would include tractor, cable, and helicopter logging.

In Alternatives A and B, no salvage would occur. Alternatives C, D and G focus on high and moderate burn severity areas greater than 10 acres and less than 40 percent canopy cover where the fire resulted in a stand replacement event. Alternative C is based on guidelines from the LSRA including snag and CWD retention recommendations. Alternative D follows the guidelines from the NFP (USDA and USDI 1994, C-14). Snag and CWD retention levels in this alternative were based on the DecAID wood advisor developed by the LSR working group (see Appendix D).

Alternative E considered high, moderate, low, and very low burn severity areas for salvage. Snag retention levels within the high and moderate burn severity areas for this alternative would be 6-14 snags per acre, based on study by a Haggard and Gaines in 2001 (Haggard and Gaines 2001). The study found the highest diversity in cavity nesting species and highest number of nests in areas where snag densities ranged from 6 -14 snags per acre. Snag retention within the low and very low burn severity areas would be four snags per acre. The CWD level in this alternative would be 120 linear feet 16" by 16' per acre.

In Alternative F, the emphasis is on implementing guidance contained in Recommendations for Ecologically Sound Post-Fire Salvage Management and Other Post-Fire Treatments on Federal Lands in the West (Beschta, et al. 1995). Emphasis would be placed on recommendations to avoid severely burned areas, erosive sites, fragile soils, riparian areas, steep slopes, or sites where accelerated erosion is possible. Other recommendations from this paper were considered but were not included (see 2.5.1 - Alternatives Considered but Eliminated from Detailed Analysis). Existing snags and CWD levels would be retained on all these areas. Salvage would occur in patches of fire-killed trees between 3 and 10 acres. Within each of these patches, a minimum of two acres would be reserved from salvage.

Alternative G is designed to investigate the influences of post-fire salvage and salvage intensity on wildlife response. This alternative was designed in collaboration with Oregon State University scientists and the Cooperative Forest

Ecosystem Research (CFER) group. For this study, 16, 30-acre or greater units were selected. The objective for this study is to determine the relative influence of three levels of salvage on wildlife species.

Four treatments will be implemented in the study:

1. Control
No salvage activity would occur.
2. Light Salvage Prescription
No salvage would occur in 65 percent of the site. In the remaining 35 percent of the site, 6 trees per acre greater than 20" DBH would be retained. The unsalvaged area would include riparian areas, if present. Snags would be retained in a scattered pattern throughout the salvaged area.
3. Moderate Salvage Prescription
No salvage would occur in 30 percent of the site. In the remaining 70 percent of the site, 6 trees per acre greater than 20" DBH would be retained on all sites. The unsalvaged area would include riparian areas, if present. Retained snags would be dispersed throughout the salvaged area.
4. Heavy Salvage Prescription
The entire site would be salvaged. Six trees per acre

Table 2.3-1. Distribution of Fire-killed Trees

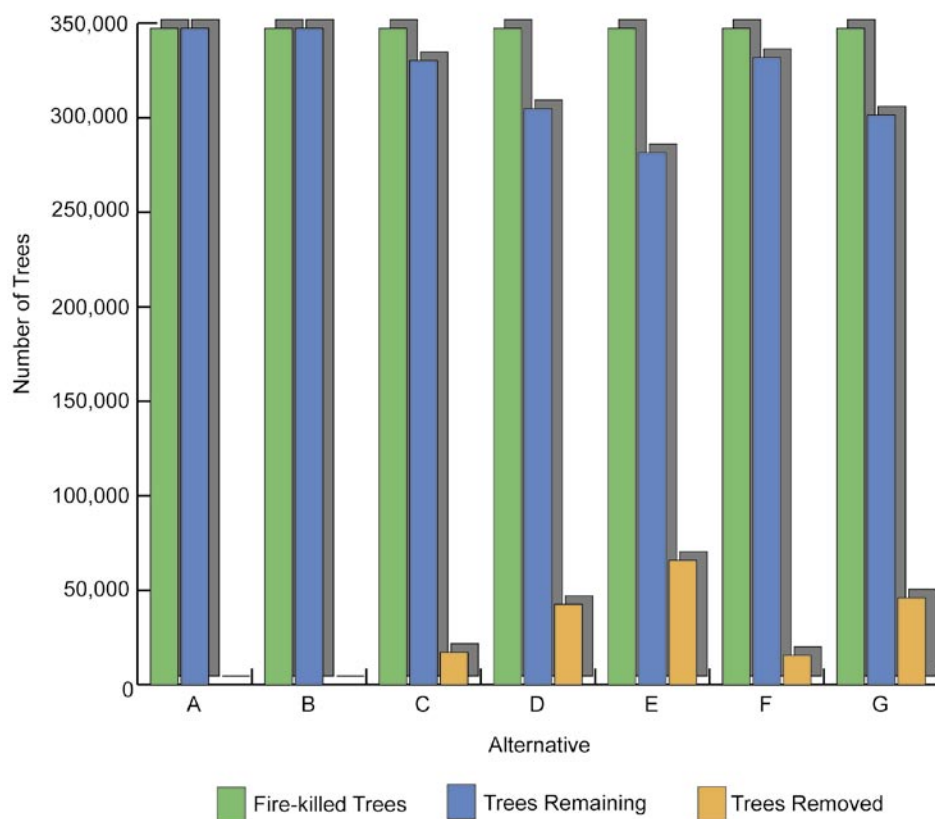
Acres of stand-replacement in riparian	656
Acres of stand-replacement in areas <10 acres in size	551
Acres of all other stand replacement	1,379
Total acres of stand replacement	2,586
Low severity burn areas; >40% canopy cover	7,206
Total acres of fire-killed trees	9,792

greater than 20" DBH would be retained throughout the site. Retained snags would be dispersed throughout the salvaged area.

In the salvage research units, all management activities, such as reforestation, should be identical across treatments.

In areas other than the salvage research units, salvage areas could occur in high and moderate severity areas greater than 10 acres. Snag retention in these units would follow recommendations from a number of local and regional references (see Appendix D). These research proposals are further described in the project descriptions with the complete study plans found in Appendix G. Salvage could occur in areas less than 10 acres in size for operation

Figure 2.3-1. Disposition of Fire-killed Trees within the Timbered Rock Fire



purposes and where adjacent to FMZs.

Table 2.3-1 shows how the fire-killed trees are distributed across the Timbered Rock Fire area. Scattered areas within the fire perimeter were unburned.

Figure 2.3-1 illustrates the number of fire-killed trees that would be retained and/or salvaged by alternative.

2.3.1.2 Salvage of Roadside Hazards

Roadside salvage along BLM-administered roads is proposed in Alternatives C-G. The intent is to capture the economic value of the fire-killed trees that are or could be a hazard to road users, including the public, government employees, private landowners, and contractors. Hazard trees previously felled along the Pacific Power powerline in T32S, R1E, Section 5 would be salvaged. Trees felled within riparian areas or needed for log piles for wildlife habitat would be excluded from salvage.

The area considered for roadside salvage is generally a 200' strip above and below the roads or roads needed on a temporary basis for post-fire operations. Not all trees within this 200' strip are hazards and therefore would not be salvaged; only those trees that pose a threat or potential threat would be harvested. Guidance from the Occupational Safety and Health Administration (OSHA) would be considered to determine hazard trees. Roadside hazards would vary by location along the road and burn severity. Areas below the road would have fewer hazard trees than areas above the road. Stand replacement areas (generally high and moderate severity) would have higher concentrations of hazard trees. Areas of low and very low severity would have fewer hazard trees and would be isolated trees scattered along the roads.

Table 2.3-2 shows the approximate acres of roadside salvage by burn severity within each alternative.

The BLM would not specifically identify hazard trees along roads through riparian areas or in owl activity centers with suitable habitat. Hazard trees identified by road users in these areas would be cut. Only the tree or portion of tree that falls within the road prism, from the top of the road cut to the top of the fill, would be salvaged.

2.3.1.3 Project Design Features

The following Project Design Features (pdf) are included in the design of salvage projects in Alternatives C-G. These pdfs are a compilation of the Best Management Practices identified in the Medford District RMP and resource protection measures identified by the EIS ID Team. The pdfs would serve as a basis for resource protection in the implementation of any salvage actions. They will be considered in the analysis of the impacts of salvage in the Chapter 3.

1. The total number of skid trails would be minimized by designating skid trails with an average of 150' spacing. Avoid creating new skid trails and utilize existing trails where feasible in order to minimize ground disturbance, especially in thinning and selective cut units where no ripping is proposed. Design skid trails to minimize disturbance.
2. All tractor yarding, soil ripping, and excavator piling operations would be limited to the dry season, generally from October 15 to May 15, and/or when soil moisture exceeds 25 percent.
3. Activity slash would be lopped and scattered, piled, or burned as necessary to reduce or eliminate additional fuel loading. Piled slash would be burned during the fall and winter to reduce impacts on air quality. All burning would follow the guidelines of the Oregon Smoke Management Plan.
4. Tractor and/or mechanical operations would be restricted to slopes generally less than 35 percent.
5. Skid trails would be waterbarred during the same operating season as constructed.
6. All road renovation, decommissioning, and/or improvement work would be limited to the dry season, generally from October 15 to May 15, or when soil moisture exceeds 25 percent.
7. Selected roads would be blocked and barricaded after use and before beginning of rainy season (generally October 15).
8. Roads identified for decommissioning would be seeded with native seed and mulched in the same operational season they are decommissioned.
9. Skid trails would be located to minimize disturbance to coarse woody debris (CWD). Where skid roads

Table 2.3-2. Acres of Available Roadside Salvage by Burn Severity

Burn Severity	Alternative C	Alternative D	Alternative E	Alternative F	Alternative G
High/Moderate	127	136	54	233	74
Low/Very Low	951	950	482	949	881
Total	1,078	1,086	536	1,182	955

- encounter large CWD, a section of the CWD would be bucked out for equipment access. The remainder of the CWD would be left in place and not disturbed.
10. Refueling of equipment would take place outside of the Riparian Reserves.
 11. A Spill Prevention, Control, and Countermeasure Plan (SPCC) would be required prior to operation and would include, but not be limited to, identification of hazardous substances to be used in the project area and identification of purchasers' representatives responsible for supervising initial containment action for releases and subsequent cleanup.
 12. All hazardous materials and petroleum products would be stored outside of the Riparian Reserves in durable containers and located so that any accidental spill would be contained and not drain into the stream system.
 13. Dust abatement materials, such as lignin, Mag-Chloride, and/or approved petroleum based dust abatement products, would not be applied during or just before wet weather and at stream crossings or other locations that could result in direct delivery to a water body (typically not within 25' of a water body or stream channel.).
 14. Harvest would be restricted from March 1 to September 30 within ¼ mile of known spotted owl sites (within ½ mile for helicopter operations). This restriction may be waived if non-nesting is determined. If any new owls were discovered in harvest units following the sale date, activities would be suspended until mitigation could be determined.
 15. Harvest would be restricted from March 1 to September 30 within ¼ mile of known spotted owl sites (within ½ mile for helicopter operations) in any green stand determined to be suitable as Northern spotted owl nesting habitat that has not been surveyed. This restriction may be waived if non-nesting is determined.
 16. Activities would be restricted from February 1 to August 1 within ½ mile of suitable, unsurveyed peregrine falcon nest cliffs (within 1 mile for helicopter operations).
 17. Activities would be restricted from March 1 to August 1 within ¼ mile of newly discovered great gray owl nests or within unsurveyed, suitable great gray owl habitat.
 18. Surveys would be conducted prior to any activity that could alter habitat for Survey and Manage mollusk and red tree vole species. Sites would be protected consistent with current management guidelines.
 19. Activities would be restricted from March 1 to July 15 within suitable unsurveyed Goshawk habitat.
 20. Mitigation measures and buffers would be applied to known archeological sites, as needed to avoid disturbance.
 21. Seed, feed grains, forage, straw, and mulch would be free of weed reproductive plant parts, as per the North American Weed Free Forage Certification Standards.
 22. Equipment would be free of weed reproductive plant parts prior to moving into the management area.
 23. Location of waste stockpile and borrow sites resulting from road construction or reconstruction would be at least one site potential tree length from a stream where sediment-laden runoff could be confined.
 24. When removing a culvert, slopes would be pulled back to the natural slope or at least 1:1.5 to minimize sloughing, erosion, and potential for the stream to undercut streambanks during periods of high stream flows. Stream channels would be restored to bank full width and natural grade.
 25. Areas identified for ripping (skid roads, landings, decommissioned roads) would be ripped to a depth of 18 inches utilizing a sub-soiler or winged toothed rippers.
 26. Ripping of skid trails would occur in all tractor yarded salvage units.
 27. Appropriate mitigation measures would be applied to ensure that fuels or hazardous materials from heavy equipment operations do not enter stream channels.
 28. Cultural resources discovered during project implementation would be reported to the authorized offices and protected until properly evaluated.
 29. Salvage yarding requires full suspension over streams and no streambank disturbance.
 30. Special Status and Survey and Manage vascular plant, lichen, bryophyte, and fungi sites that require protection would be buffered. Buffer sizes would be determined based on species, proposed treatment, site-specific environmental conditions, and management recommendations.
 31. Apply native grass seed on landings and tractor skid trails within 50-feet of existing roads. Apply native grass seed on all helicopter landings. Use appropriate native species.
 32. Soil disturbed during road work or culvert replacement would be seeded with native grass

seed after completion of work, using appropriate native species.

33. Hand waterbar corridors in roadside salvage areas above roads where drainage would lead directly to streams.
34. Waterbar all yarding corridors within Riparian Reserves.
35. Waterbar yarding corridors where needed as determined by the contract administrator.
36. Divert the stream around the work area in a manner (e.g. pipe or lined ditch) that would minimize stream sedimentation. Contractor would submit a water diversion plan for approval prior to stream work. To reduce movement of sediment downstream from the project site, the use of straw bales, geotextile fabric, or coconut fiber logs/bales immediately downstream of the work area would be required.

2.3.2 Restoration Proposals

Restoration projects are proposed in the action alternatives, Alternatives B-G. Alternative A (No Action) has no restoration projects proposed, but rehabilitation and stabilization projects proposed in the Timbered Rock Fire Rehabilitation/Stabilization Project Environmental Assessment (ESRP) would be implemented.

Four levels of restoration projects are proposed in the six action alternatives: focused, moderate, extensive and focused within the fire perimeter. The alternatives vary by the scope of the projects (acres, miles of roads, etc.), intensity of the treatments, and location of the treatments. Restoration projects are located both within the Timbered Rock Fire perimeter and outside the fire area. Most projects are located within the Elk Creek Watershed; however, a proposed eagle nest project and some fuel management zone (FMZ) projects are located on a ridge top within adjacent watersheds. Projects are based on recommendations presented in the LSRA and/or Elk Creek WA, or were developed to address specific issues.

Projects proposed within the fire area focus on road projects to reduce existing and potential erosion from the road network, fish habitat improvement projects, development of Fuel Management Zones (FMZ), and reducing future hazardous fuel conditions within existing Northern Spotted Owl activity centers. Reforestation of the burned area was assessed in the ESRP EA. Alternatives A and E follow those recommendations. Other approaches to reforestation are presented in Alternatives B, C, D, F, and G. A reforestation study is included which would evaluate a variety of planting densities, species, and follow-up treatments in both salvage and unsalvaged areas. This reforestation research could be incorporated into any alternative. These research proposals are further described in the project descriptions with the complete study plans found in Appendix G.

Summaries of proposed restoration projects are presented below. See Appendix E for a more detailed description.

2.3.2.1 Fish Habitat Improvement Projects (see Map 2-1)

Objective

To improve habitat complexity and passage for salmon and trout, to mitigate any adverse effects from chronic erosion, and to improve shade and future large wood recruitment in the first 160 feet from the stream.

Desired Future Condition

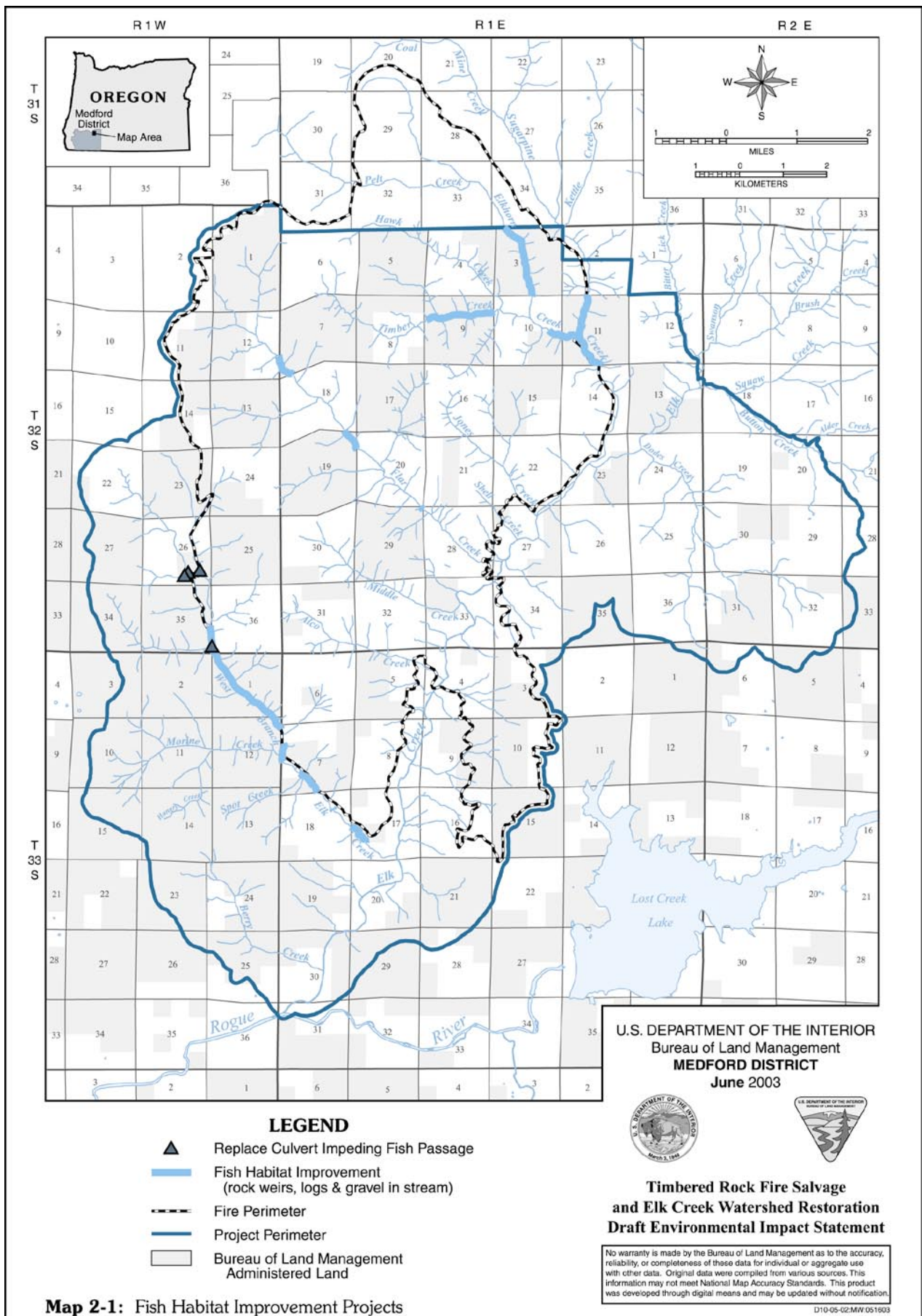
Improved fish passage through culverts; logs almost parallel to the stream, pointed downstream, and cabled at one end to the bank to provide adult holding cover and rearing habitat; rock weirs to provide spawning gravel retention and rearing habitat; and trees reestablished in the Riparian Reserve to improve shade and future large wood recruitment to the stream.

Project Design Features

Replacement of four culverts and removal of one culvert for trout and potential coho passage would open five miles of habitat. The use of vortex rock weirs would aid in collecting gravels for spawning and create plunge pools for rearing. Rock weirs would be placed from 3 weirs per mile to 10 weirs per mile. Gravel would be placed at rock weirs at a rate of approximately 39 cubic yards per weir. Large wood (20-24" DBH) would be placed almost parallel to the streambank for adult holding cover. Log placement would vary from 15 logs per mile to 25 logs per mile. Fifteen logs per mile is based on the Klamath Province and twenty-five logs per mile is based on a mix of Klamath and Cascade Province recommendations (Shatford 2002, 23-24).

Smaller diameter trees would be taken from Riparian Reserve thinnings and added to the stream where appropriate. As part of the riparian thinning restoration plan, trees 10 to 80 years old would be thinned from 30-160 feet from stream channel, provided 70 percent canopy is retained.

Instream projects would include the use of an excavator. The excavator would make a 12-foot wide path from the road to the stream, with no more than ten passes on the path. No blading on the path would occur. Other resources in conflict with the designated sites would be mitigated with a buffer. Equipment would avoid archeological and botanical sites.



2.3.2.2 Vegetation Restoration Projects (see Map 2-2)

Late-Successional Forest Habitat Restoration

Objective

Accelerate the growth of trees in stands to promote late-successional conditions with a variety of size classes. Maintain species diversity to promote connectivity between owl activity sites and develop late-successional forest characteristics.

Desired Future Condition

Suitable spotted owl habitat for nesting, roosting, and foraging composed of mature timber stands. Stands contain large conifers (21" DBH or greater), multi-layered structure, and 60 percent or greater canopy closure (USDA and USDI 2001, I-2, 3). Understory should be open between shrub layer and mid-canopy for flight paths. Nest sites include cavities 50 or more feet above the ground in large decadent old growth conifers, large mistletoe clumps, old raptor nests, and platforms formed by whorls of large branches.

Project Design Features

Stands of trees less than 8" DBH (10-29 years old) would be pre-commercially thinned (PCT) to accelerate the growth of reserve trees. Stands of trees greater than 8" DBH (30-80 years old) would be commercially thinned to increase growth on residual trees, retain and promote large branches on select trees, promote the development of variable tree sizes in the residual stand, and retain the variety of species present.

Condition 1: Young conifer plantations generally 10 to 30 years old.

These stands are comprised of conifers of similar size. Thin conifers to a spacing range of 12-15 feet to increase growth rates, yet allow for crown closure within 10-20 years. This would promote natural shading, mortality, and removal of lower limbs. Retain up to 25 percent canopy component in hardwoods. Select up to 25 trees per acre and remove all surrounding vegetation for approximately 5 feet beyond the dripline. This would increase growth rates and retain limbs to allow for future large branches as these trees mature and become dominant in the overstory. Pile and burn slash from operations.

Condition 2: Young stands with mixed age and size classes, scattered overstory conifers.

These stands also have variable densities of conifers and hardwoods. In areas where predominant conifer size is less than 3" DBH, thin to a spacing of 12-15 feet. Areas where the predominant conifer size is 3"-8" DBH, thin to a spacing

of 15-20 feet. Retain hardwood trees unless they constitute greater than 25 percent of the canopy. Reduce hardwood component to 25 percent of canopy in stand being treated. Pile and burn slash from operations

Condition 3: Stands dominated by conifers in age classes from 30 to 80 years old.

Conifer and hardwood densities and size classes are variable. Stands would be thinned to a basal area range of 120-140 feet per acre of total overstory basal area, retaining a minimum of 50 percent canopy closure in stand. Retain up to 25 percent of canopy component in hardwoods. Reserve trees would be a mix of species present. Variable spacing and reserving both dominant and codominant tree sizes is preferred over even-spacing and even-size distribution of reserve trees. Pile and burn slash from operations.

Pine Habitat Restoration Objective

Promote pine species regeneration in areas historically inhabited by pines, retaining existing dominant pine in the overstory. Promote pine dominance in stands historically dominated by pines but presently dominated by Douglas-fir and other species.

Desired Future Conditions

Ponderosa and sugar pines dominant in the overstory up to 23 trees per acre (tpa) with a codominant component of pines (<20" DBH) up to 40 tpa. An understory of conifers dominated by pines (<12" DBH) with less than 80 tpa (USDA and USDI 1998, 179). Mix of conifers in the overstory, including Douglas-fir and incense cedar and a component of hardwoods in mid-canopy and understory including madrone and chinquapin.

Project Design Features

Stands with ponderosa or sugar pine present in overstory or understory, or historic presence of pine in overstory would be thinned to promote pine retention and growth. Large overstory pines would have non-pine vegetation in understory removed to promote pine regeneration. Stands with pine less than 80 years old would be thinned to retain pine and promote growth of existing pine in stand.

- **Stands with large (>20" DBH and >80 years old) overstory ponderosa or sugar pines present.**

In areas where pine are not present in the understory, clear around large (>24" DBH) overstory pines for up to 20 feet beyond dripline to promote pine regeneration. Trees up to 24" may be removed (USDA and USDI 1998, 165). When large overstory trees are within 50 feet of each other, only one of those trees would receive understory clearing.

Beyond the clearing area, pre-commercial thin (14-20 foot spacing) understory stands (<8" DBH) presently consisting

of Douglas-fir, white fir, incense cedar, ponderosa and sugar pine, madrone, and chinquapin to favor dominance of pine species as residual stand.

Beyond the clearing area, commercial thin understory stands (> 8" DBH) retaining 100-180 square feet of total basal area retaining the same species preference for pine. Only trees less than 80 years old would be removed. These would generally be less than 18" DBH.

- **Stands with sugar and ponderosa pines present in overstory predominantly less than 18" DBH (30-80 years old).**
Commercial thin these stands favoring all healthy pines for reserve trees retaining 100-180 square feet of total basal area (USDA and USDI 1998, 190).
- **Young stands less than 8" DBH with pine present and without pine in the overstory, but with historic presence of pine in the overstory.**
Pre-commercial thin (14-20 foot spacing) stands presently consisting of Douglas-fir, white fir, incense cedar, ponderosa and sugar pine, madrone, and chinquapin to favor dominance of pine species as residual stand.

Introduce prescribed fire into the understory after reducing initial fuel loadings through piling and burning of piles.

Riparian Reserve Thinning

Objective

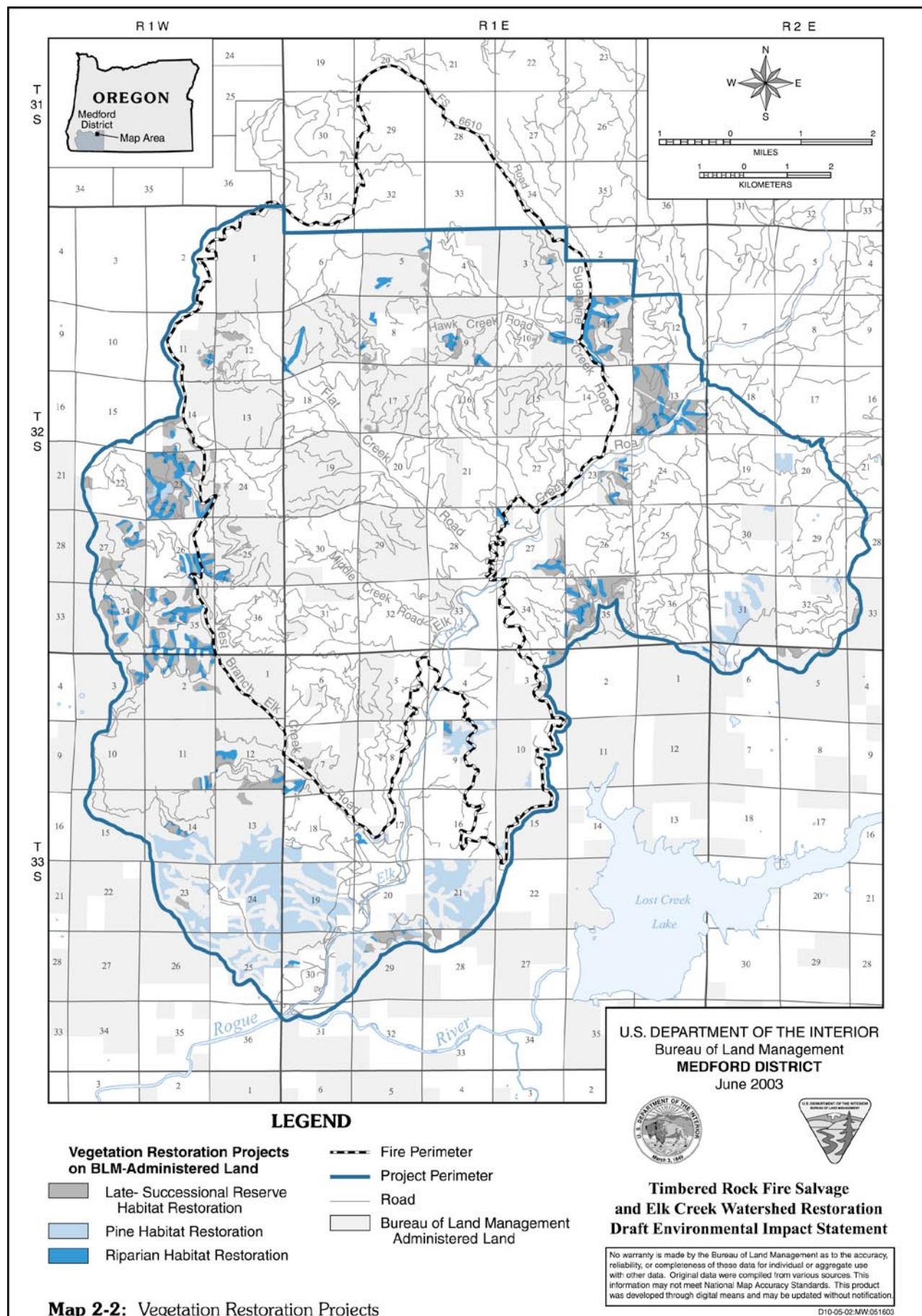
Improve the habitat and functioning of Riparian Reserves for late-successional dependent terrestrial and aquatic organisms. Accelerate the growth rates and size variability of residual trees in the existing stands and maintain species diversity.

Desired Future Conditions

Functioning riparian area that allows for late-successional species movement and stream protection, and maintains species composition and characteristics needed to attain Aquatic Conservation Strategy. Attain 75 percent late seral vegetation in riparian areas. Riparian vegetation would be dominated by large (> 24" DBH) conifers with a diverse species composition including riparian hardwoods and mixed conifer species. Conifer species of preference would be Douglas-fir, incense cedar and pacific yew, with western hemlock and white fir in the upper elevations (above 3,500') and ponderosa and sugar pine in the lower elevations (below 3,000') particularly on south exposures. Hardwoods species to favor include alder, big leaf maple, and Oregon ash. Canopy closures would generally be greater than 70 percent. The stand would be able to supply amounts and distributions of coarse woody debris sufficient to sustain physical stability and complexity (USDI 1995, 22).

Project Design Features

Stands of trees less than 8" DBH (10-30 years old) within Riparian Reserves would be pre-commercially thinned to accelerate the growth of residual trees. Stands of trees greater than 8" DBH (30-80 years old) would be thinned to increase growth on residual trees, promote large branches on select trees, and develop the recruitment of large woody material for streams. This would occur on trees less than 20" DBH. Thinning would be performed on an irregular spacing with reserve trees selected to aid in the development of future stand characteristics such as variable spacing, multistory canopies, large limbs, and canopy gaps (USFS 2000). Pile and burn slash from treatments in stands <8" DBH. Leave a no-cut buffer zone 50' from streams with coho and 30' from all other streams.



Map 2-2: Vegetation Restoration Projects

Oak Woodland and Meadow Restoration (see Map 2-3)

Objectives

Maintain or enhance oak woodland and meadow values for wildlife, range, plants, and biological diversity. Protects and improve special habitats within the Elk Creek Watershed.

Desired Future Condition

Oak woodlands in an open condition that favors large oaks and pines and a diversity of native grasses, forbs, and shrubs and also provides for future regeneration of oaks and pines. Meadows would be in an open condition.

Project Design Features

Management activities could include manually thinning small-diameter white oak; removing competing conifers; clearing around large, healthy pine; manually cutting, piling, and burning older brush patches; and applying frequent low-intensity prescribed fire. Meadow openings would be maintained by removing Douglas-fir and incense cedar from around the edges of meadows.

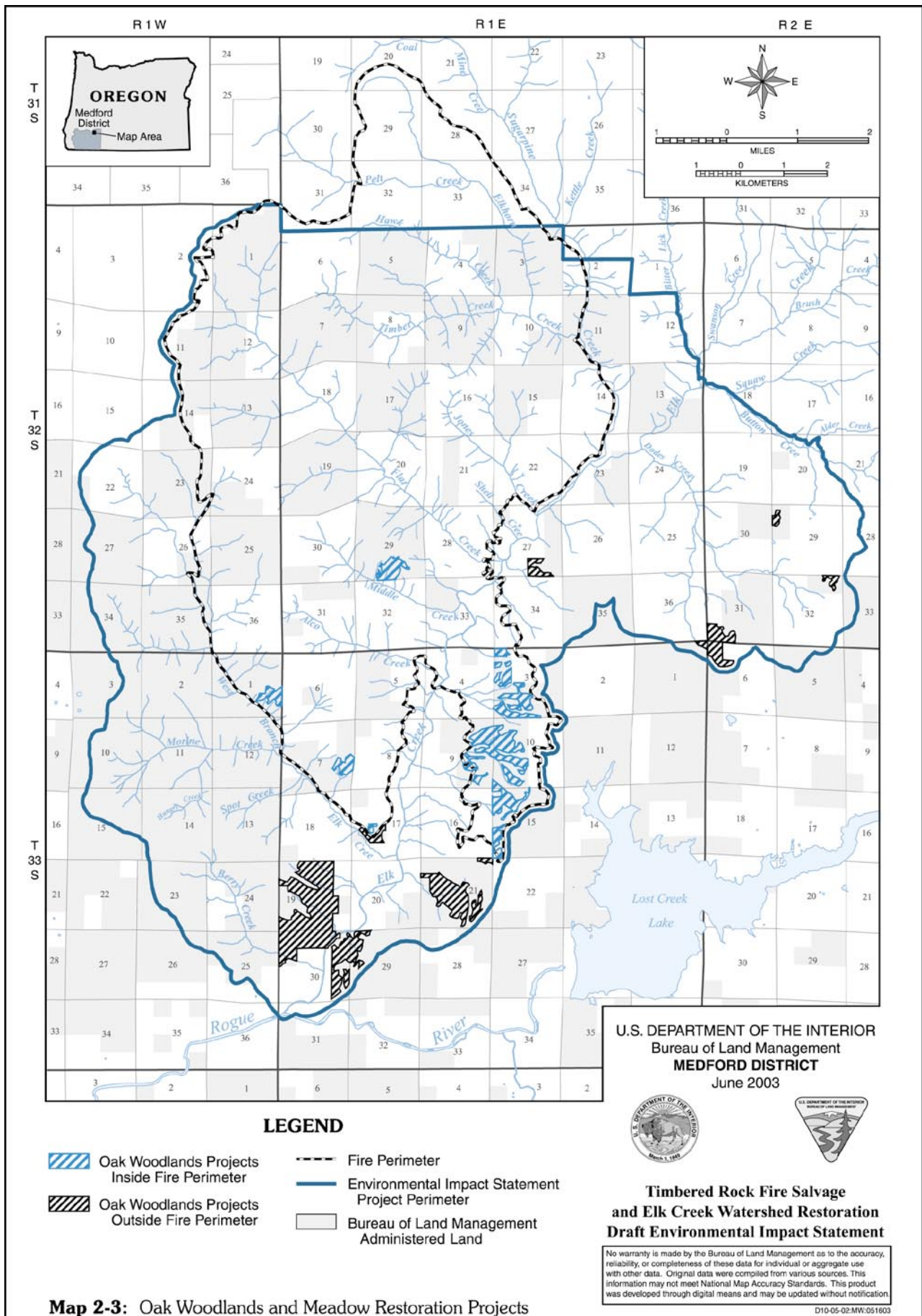
Inside the fire perimeter, sites would be monitored and treatment applied when vegetative conditions warrant (in 5-15 years). Those conditions are:

- Numerous small conifer seedlings reappearing on a site.
- Large amounts of brush seedlings reoccupying the site.
- Oak resprouting or oak seedlings reoccupying the site.

Outside the fire perimeter, site-specific treatment would include the following:

- Manually thinning small-diameter white oak.
- Manually thinning small competing conifers.
- Clearing around large, healthy pine.
- Manually cutting, piling and burning older brush patches.
- Applying low-intensity fire.
- Treatments would be staggered over several years so areas are treated at different times and oak woodlands in different successional stages are scattered across the landscape. Treatments would not begin until at least 2004.

Prescribed fire would be applied under conditions when a low intensity, short-duration fire would occur. Heat per unit area would exceed 750 Btu/ft². Flame length would average 2 feet or less. Fires would need to be prescribed while reestablishing vegetation is small enough to be susceptible to the low flame lengths. Some manual slashing of woody vegetation may be required prior to burning in order to meet resource objectives.



Reforestation (see Map 2-4)

Objective

Reforest areas that supported forest vegetation before the fire. Plant areas with species representative of the plant series existing in those forest stands. Place a stand on a pathway toward a mixed conifer forest that can, more quickly, obtain the attributes of a late-successional forest than would occur naturally.

Desired Future Conditions

Mixed conifer stands at age 20 with a minimum of 70 percent canopy closure and a hardwood component of up to 25 percent of canopy. Retain a residual level of remnant overstory trees, snags, and coarse woody debris as described in stand advisories for late-successional habitat or the LSRA. This is an interim stage. The final condition for stands in this watershed is described in the proposed Late-Successional Forest Habitat Restoration project.

Project Design Features

Areas of the fire that burned at high or moderate severity levels would be planted with tree seedlings to a species mix consistent with those species present in those locations before the fire. Priority for planting would be in past plantations, areas with slopes greater than 65 percent, riparian areas, and remaining areas of high or moderate burn intensity, including spotted owl activity centers.

Reforestation Research Project

Objectives

To evaluate mixed-species reforestation plantings, to identify and characterize temporal patterns of vegetation structural development and species diversity, to assess temporal dynamics of fuels loading and fire risk, and to determine impacts of snag retention on survival and growth of planted trees.

For the initial phases of stand development, there are six specific research objectives:

1. Determine the effect of snag retention on the survival and establishment of planted seedlings by species.
2. Determine the effects of pure versus mixed-species planting on survival and growth, and site occupancy by planted and naturally regenerating vegetation.
3. Determine the effect of planted seedling versus natural regeneration on survival and growth, and site occupancy by species.
4. Determine the effect of planting density on the survival and establishment of planted seedlings by species, and site occupancy by planted and naturally regenerating species.
5. Determine the effects of weed control on planted

seedling establishment and growth.

6. Determine the effect of physiographic site on seedling survival and growth, and site occupancy by planted and naturally regenerating species.

Desired Future Conditions

Forest stands having a high degree of species and structural diversity (relative to monospecific plantations) in which Douglas-fir, white fir, and incense cedar contribute to the main overstory canopy as codominants; dispersed sugar pine and ponderosa pine having complex canopy structure and large diameter stems and branches as dominants; and sub-canopy hardwood trees providing structural continuity between understory shrubs and the overstory.

Project Design Features

This planting is a research project designed to provide a rigorous basis for evaluating the efficacy of snag retention, mixed-species plantings, variable planting density, and woody vegetation removal as means for regulating the development of biologically and structurally complex forest stands, and for varying the temporal dynamics of fuels profiles and fire risk.

Six species composition, planting density, and vegetation removal treatments (weeding) will be established:

1. Unplanted, woody vegetation not removed
2. Douglas-fir, planted at 435 tpa, woody vegetation removed
3. Mixed species planting, 435 tpa, woody vegetation removed
4. Mixed species planting, 435 tpa, woody vegetation not removed
5. Mixed species planting, 190 tpa, woody vegetation removed
6. Mixed species planting, 190 tpa, woody vegetation not removed

Woody vegetation removal on designated treatment plots will be completed manually prior to planting, in year 1 and in year 3; and in year 5 if necessary, following planting.

Species mixes will consist of the following:

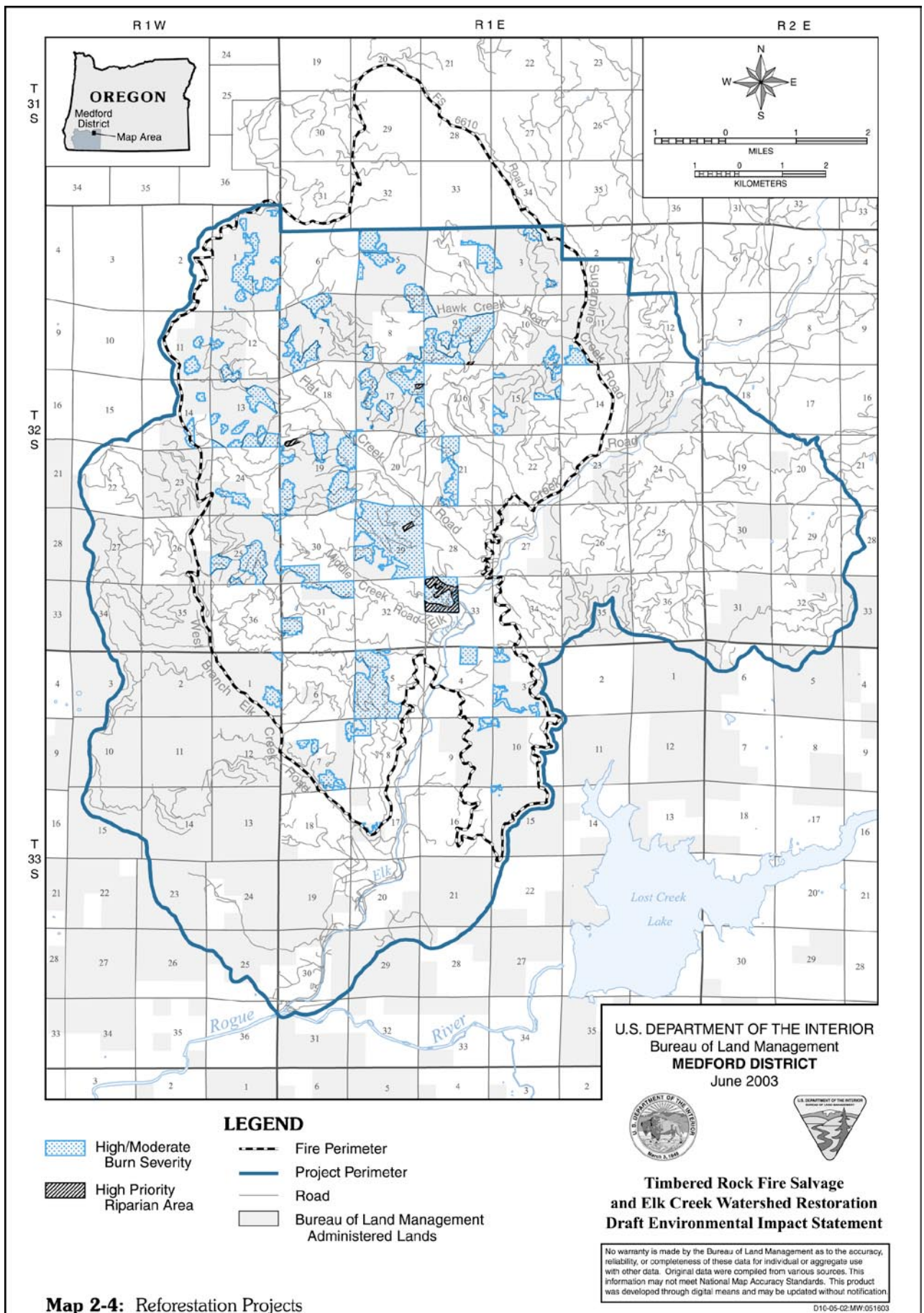
Sites 3500' + elevation – Douglas-fir, 20%; White fir, 20%; sugar pine, 20%; incense cedar and ponderosa pine, 20%; hardwood sprouts (Pacific madrone and/or chinquapin oak) 20%.

Sites <3500' elevation – Douglas-fir, 40%; sugar pine, 20%; incense cedar and ponderosa pine, 20%; hardwood sprouts (Pacific madrone and/or chinquapin oak) 20%.

Where specified, hardwood densities will be obtained by retaining hardwood sprouts, thinned to a single stem per clump, at the 20 percent proportion prescribed.

The treatments will be implemented on both unsalvaged and salvaged sites to evaluate effect of residual snags as microsite modifiers on seedling establishment. Some treatments will be replicated on moderate and harsh planting sites as defined predominantly by aspect (northerly vs. southerly), but also taking into account soil depth (shallow vs. deep) and slope position (mid vs. upper).

A total of 50, 1.5 acre plots will be established and allocated by treatment condition as outlined in Appendix Table E-7.



2.3.2.3 Fuels Treatment Projects (see Map 2-5)

Fuel Management Zones (FMZ)

Objective

Create FMZs to assist in future wildfire suppression activities, to provide for firefighter safety, and to provide anchor points for control lines. To meet the LSRA recommendation for breaking the watershed into 5,000- to 7,000-acre blocks.

Desired Future Conditions

A series of FMZs on the ridgelines, on the perimeter and within the LSR. Anchor points for fire lines, burnout operations, and possible safety zones for firefighters. LSR divided by FMZs into blocks of 5,000- to 7,000-acres to reduce future fire size.

Project Design Features

Within the burn perimeter, stand replacement areas less than 10 acres would be salvaged to reduce fuel loadings and reduce spotting potential. Proposed units would be located within an identified FMZ and cover between 30-50 acres. A target of six snags per acre would be left standing on or near the ridge top. The preferred leave snags would be the shorter snags. The understory vegetation would be cut, piles, and burned.

FMZs proposed in the unburned portion of the watershed would have the understory conifers and hardwoods would be thinned and slash would be hand-piled. Hand-cutting, hand-piling, and burning of brush would occur. The majority of the conifers cut would be 6" DBH and less. In some cases, small diameter commercial conifers would be cut and removed as needed to reduce crown bulk density to a level that would not perpetuate crown fires. After ladder fuel loadings are reduced, an underburn would be conducted to further reduce ground fuels. This treatment would occur two to five years after the initial entry. A second underburn would occur 10-15 years later. At that time, initial treatment would be finished and any further treatments would be considered maintenance.

Removal of brush and sub-merchantable timber would be accomplished through hazardous fuel reductions contracts. Merchantable timber would be removed through a timber sale contract, where feasible. Approximately 35 acres located in T33S, R1W, Sections 14 and 15 would be proposed for commercial thinning.

The West Branch Fire of 1972, located in T32S, R2W, was reforested and pre-commercially thinned. This area burned again in the Timbered Rock Fire. Stand diameters range from 3-8 inches. Young conifers in this area killed in the

Timbered Rock Fire would be cut, piled, and burned. This would aid in reforestation efforts and reduce fuel loads to help reduce future fire severity.

Owl Activity Center Underburns

Objective

The short-term objective is to reintroduce fire to maintain existing reduced fuel loadings and current fuel profiles created by the Timbered Rock Fire, and to simulate the historic natural disturbance process. The long-term objective is to increase the resiliency of sites during future high intensity fire events by reducing fire severity while maintaining owl habitat in late-successional forest conditions.

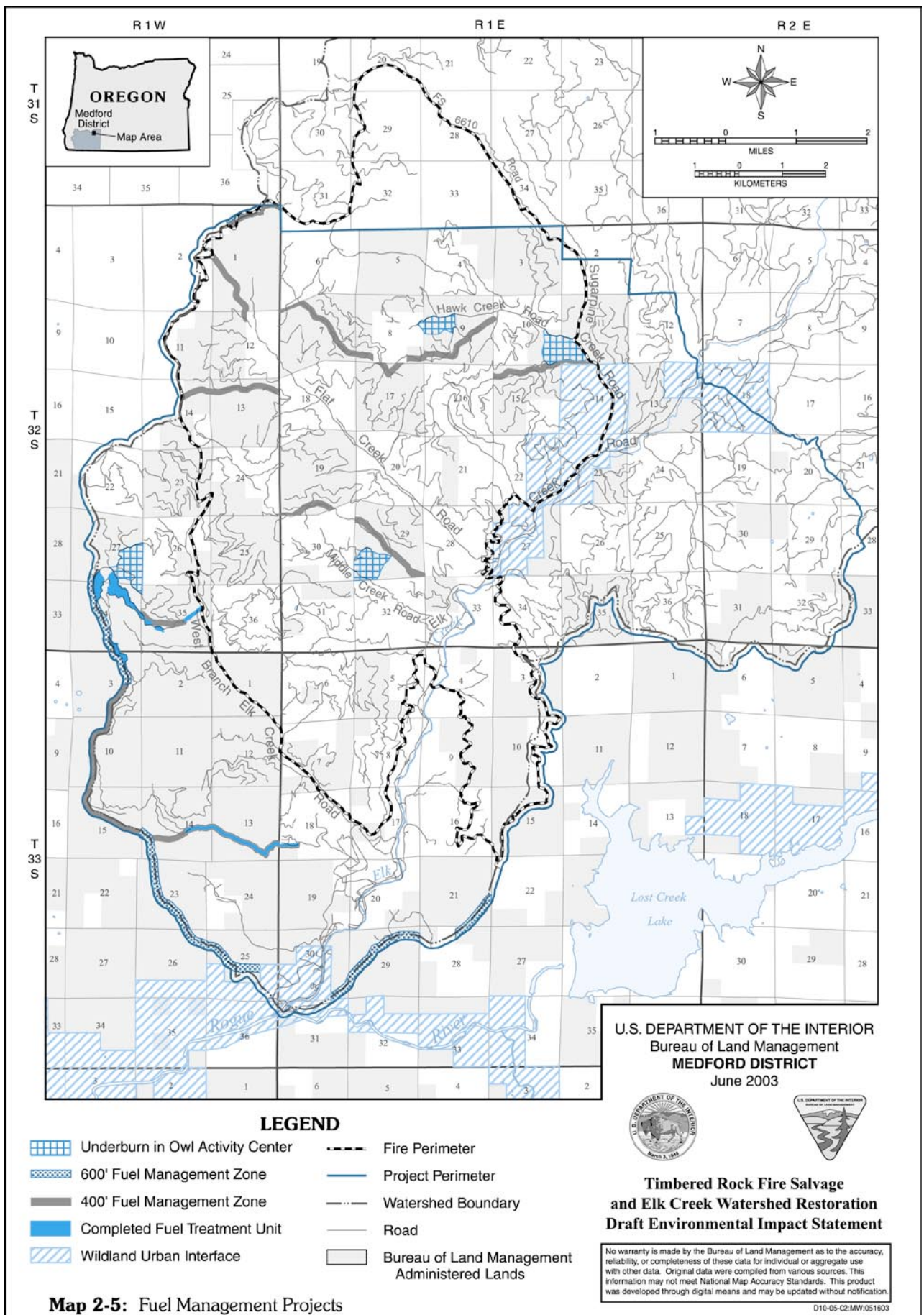
Desired Future Conditions

Multi-storied stands with low ground fuel loadings. These stands would have a break in the ladder fuels from the ground to the overstory canopy layer.

Project Design Features

This action would capitalize on the natural fuel reduction created by the Timbered Rock Fire. The proposal calls for underburning when fuel moistures for the larger, 6-inch or greater (1000-hour) fuels are at a level too moist for total consumption. The primary carrier of the prescribed fire would be the 0 to 3-inch (1- to 100-hour) fuels, litter layer, and any small brush the fire would consume. These treatments are being proposed on a limited scale to demonstrate effectiveness and ability to meet prescription requirements. The units would be configured using logical topographic breaks and may include all or portions of the owl activity centers and some adjacent areas. In addition, some burning outside the activity centers would be proposed using logical topographic breaks. Burning would occur outside of nesting season.

Initial entry would be in the next 2-3 years or later, if site conditions warrant. The need for follow up treatments would be evaluated and treatment would be proposed when fuel buildups approach the mid- to high-range of Fuel Model 11, or prior to reaching the mid-range of Fuel Model 10 (see Appendix M for fuel model descriptions). The second treatment would occur in 5-10 years and further treatments would occur in the 10- to 20-year range. All treatments will be based on actual conditions and timeframes are approximate. Seasonal restrictions would be implemented to avoid disturbing spotted owl nesting activities.



2.3.2.4 Wildlife Projects (see Map 2-6)

Eagle Nesting Habitat Enhancement

Objective

To promote growth and future development of large overstory trees into trees with large limbs or broken tops suitable for nesting eagles.

Desired Future Conditions

Scattered individuals and groups of large overstory ponderosa pine, sugar pine, and Douglas-fir trees with large limbs suitable for supporting eagle nests and with openings between branching whorls. The trees would have an open or broken canopy or would be located near the edge of the stand so the eagles would have an unrestricted flyway. Tall perch trees would be present at the edges of the stand. These nest stands would be located on the ridge between Lost Creek Lake and Elk Creek.

Project Design Features

Younger stands would be treated to promote growth of large overstory ponderosa pine, sugar pine, and Douglas-fir with large boles and thick limbs, strong enough to support the large stick nests built by bald eagles and golden eagles. Smaller trees around the meadow edges would be thinned. A residual conifer spacing of 12-20 feet would be implemented in stands less than 30 years old to promote the development of large trees with the desired habitat attributes, such as large limbs and whorls.

Stands with existing large overstory trees, treatments would improve the vigor of large overstory sugar pine, ponderosa pine, and Douglas-fir. Removing competing vegetation around selected trees would increase resistance to mortality from fire. Vegetation would be removed around the reserved large trees by clearing 10-15 feet out from the drip line of the pine. Co-dominant trees with crowns touching the selected trees would be removed unless the removal would harm reserve trees. Projects would be coordinated with proposed fuel management projects.

Two areas are proposed for treatment:

T33S, R1E, Section 15 - Around the meadows in the north central part of the section and the NWSW part of the section. The project would occur along the west side of the meadow and extend 300 feet into the stand. Two areas extend outside the project boundary into the Lost Creek Watershed; approximately 200 feet in one area and 100 feet in the second area.

T33S, R1E, Section 21 - Located within a proposed pine restoration project area. The project would occur along the north and west edge and extend 300 feet into the stand.

Maintain or Create Log Piles for Wildlife Habitat

Objective

To provide denning/hiding/resting/foraging/escape sites for animals, including larger mammals such as American martin, fisher, bobcat, cougar, and bear.

Desired Future Conditions

Scattered piles of large wood with spaces to provide denning, hiding, resting, foraging, or escape sites for animals, including larger mammals such as American martin, fisher, bobcat, cougar, and bear.

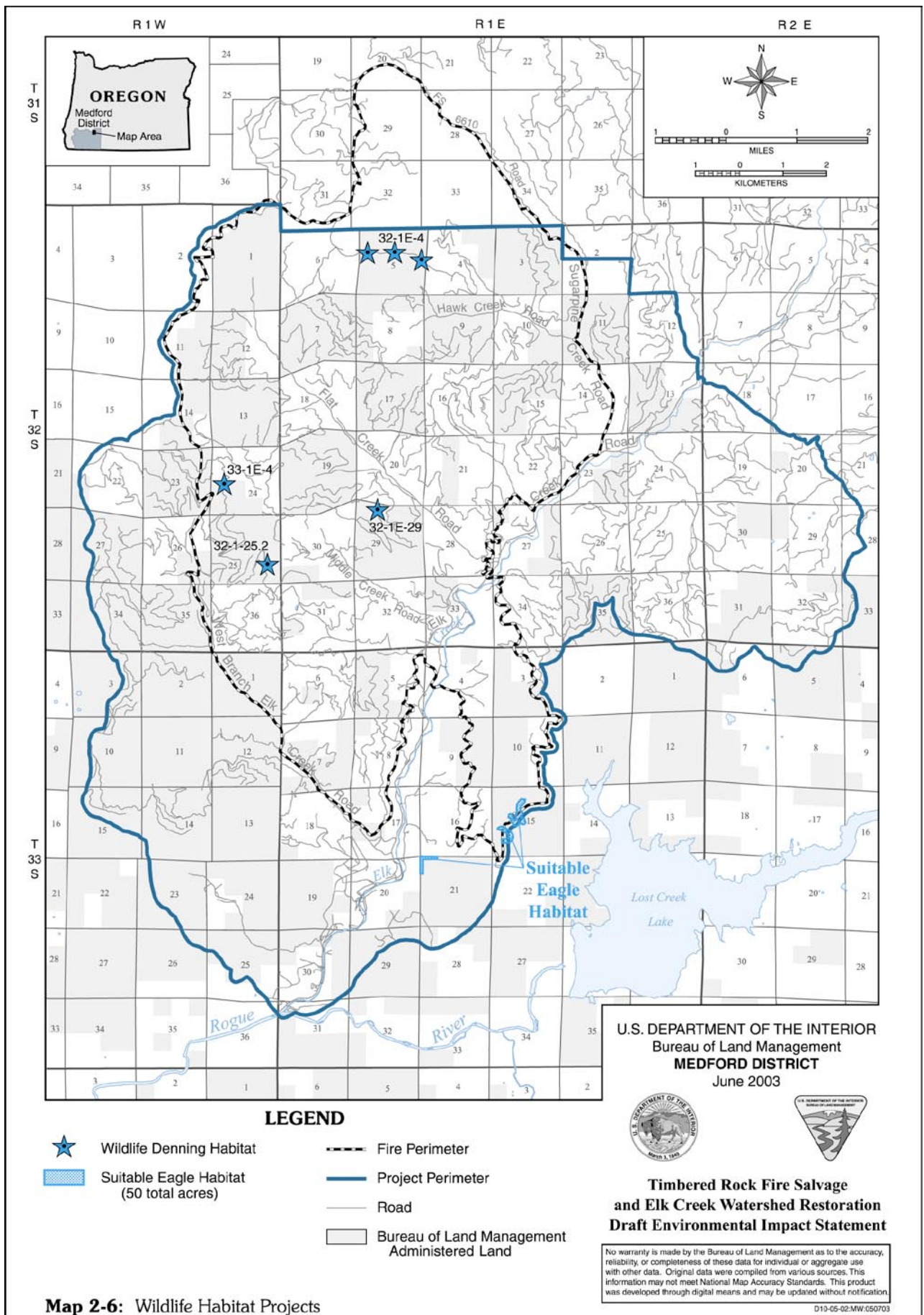
Project Design Features

During salvage operations, leave piles of fallen logs in the selected areas where trees were cut to clear the right-of-way for the Pacific Power powerline in T32S, R1E, Section 5. Selected piles would be located near the east and west borders of section and one in the middle, away from the road.

Place or leave three additional piles of larger wood between West Branch Elk Creek and Flat Creek. These would be at or near the end of a road that will be closed either with a permanent block, earthen berm, or gate. This would be completed as part of the roadside salvage. Piles would be located in areas where roads identified for decommissioning are closed to traffic.

Piles should be approximately 20' x 20' and 4' - 6' high and provide space to allow animals access within the piles. Larger logs (>16" DBH) would be stacked in a loose, crisscross/haphazard pile in a way that would create spaces beneath the wood. The logs could be smaller lengths, broken tops, and boles large enough to stack with spaces between.

Logs would be obtained from salvage operations. Broken parts and whole logs would be hauled to location and piled. Piles should be located in the largest accumulation of trees. Pile locations could be moved to a different site if adjacent land owners object to specific road closures, or if there are inadequate snags in an area near the selected location.



2.3.2.5 Road Projects (see Map 3-3b)

Road Reconstruction

Objective

Stabilize roads to reduce the risk of road failure.

Desired Future Conditions

Roads in a stable condition with a low risk of failure.

Project Design Features

Add drainage structures such as culverts and armored drain dips to reduce the chance of the road becoming saturated by water and failing. Remove unstable material from shoulders of roads and place large rocks on the face to armor the surface and function as a retaining structure to hold the fill in place. It is anticipated there would be a greater need for maintenance on roads within the fire over the next few years.

Road Stream-crossing Upgrades

Objective

Reduce the risk of road damage from debris torrents plugging culverts and diverting stream flows down roads.

Desired Future Conditions

Road fills constructed of rock, rather than mixed soil and rock fills at stream crossings in high risk locations. Road segments below the pipe would be protected from water or debris torrents diverting from the channel and eroding a gully in the roadbed.

Project Design Features

Road fills constructed out of soil and rock fill material at high risk stream crossings would be replaced with rock fills. These fills would be designed with a dip over the culvert to keep the stream flow in the channel in case the culvert plugs. Culverts would be upsized to pass 100-year storm events and allow movement of water, gravels, and debris through the culvert.

Road Maintenance

Objective

To restore or improve road segments identified in the Transportation Management Objectives (TMO) process to the desired standard.

Desired Future Conditions

To maintain road access through BLM-administered lands while minimizing erosion and sedimentation from these roads and protecting water quality.

Project Design Features

Roads would be maintained and improved, as needed. Maintenance may include: blading and shaping the road surface, adding rock to the road surface, brushing the roadsides, cleaning the ditches, cleaning culvert catch basins, cleaning or replacing culverts, and adding drainage structures such as culverts and drain dips.

Road Decommissioning

Objective

To reduce the road density in the Key Watershed by decommissioning road segments identified in the TMO process. In addition, identify road segments for closure to reduce wildlife harassment, degradation to the road surface, and trash dumping.

Desired Future Conditions

To have appropriate access to provide for administrative needs and public use. To have most roads out of the riparian areas, and few with native surfaces. Access across public lands through reciprocal rights agreements will be maintained.

Project Design Features

Roads will be decommissioned or closed as identified from the TMO process.

Seasonal Road Closures (see Map 2-7)

Objective

Reduce damage to road surface during the wet season and protect sensitive fish species from surface road erosion; protect wildlife from poaching and harassment; and reduce trash dumping.

Desired Future Conditions

Year-round vehicle access would be restricted to mainline roads. Secondary and non-surfaced roads would be seasonally closed to motorized vehicles from mid-October through April 30. Only foot and non-motorized traffic would be allowed on closed roads during the wet season. All roads would be available for motorized vehicle traffic (unless fire restrictions are in place) from May 1 through mid-October. Roads would remain open to administrative access for landowners, BLM employees, and BLM contractors and permittees.

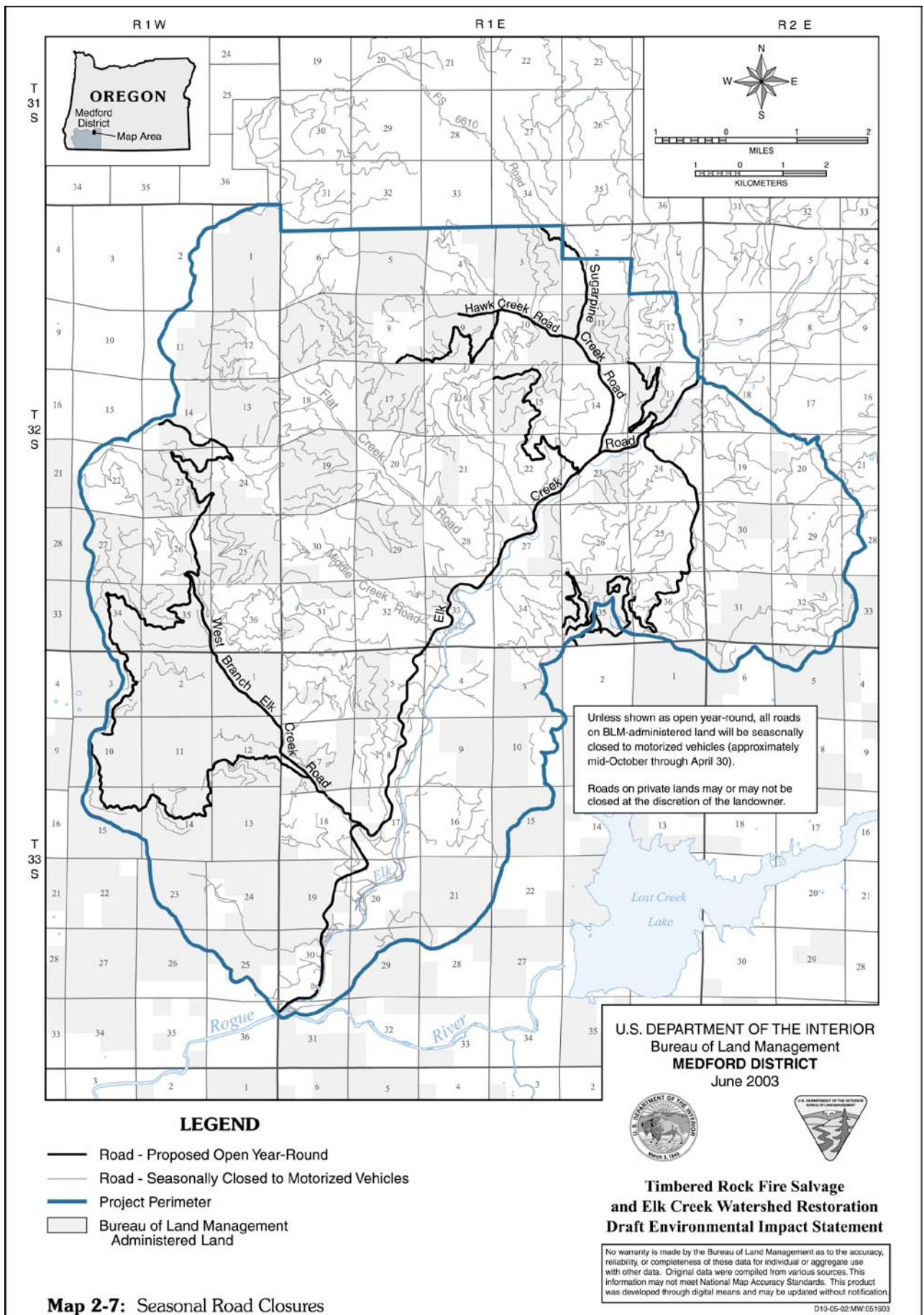
Project Design Features

Road closures would be seasonally closed to motor vehicles from mid October through April 30. Roads across private lands may or may not be closed by the landowner.

Mainline roads open to motorized vehicles year around:

33-1W-8.0, Buck Rock Road to West Branch;
 33-1W-10.0;
 32-1W-26.1, Morine Tie Road;
 33-1E-17.0;
 32-1W-26.0 to intersection with 32-1W-23.2, West Branch
 Elk Creek Road;
 32-1W-26.5, Alco Creek Road
 32-1E-27.0;
 32-1E-18.0 to intersection with 32-1E-18.3;
 32-1E-20.0 to 32-1E-17.4;
 32-1W-13, Flat Creek Road;
 32-1E-17.4 to 32-1E-17.5 to 32-1E-7.2;

 32-1E-23.2;
 32-1E-22.0, Miller Mountain Road;
 32-1E-23.0 to intersection with 32-1E-9.1, before stream
 ford, Sugarpine Creek Road;
 32-1E-10.1 to 32-1E-9.0;
 32-1E-9.0, Gobblers Knob Road;
 32-1E-11.4 and FS 31, Elkhorn Ridge Road;
 32-1E-13.1 to intersection with 13.2 and 32-1E-13.2 to end
 of rock area at boundary with section 11, North Mule Hill;
 32-1W-23.2, Ragsdale Butte;
 32-1W-36.1.



2.3.2.6 Pump Chance Reconstruction (see Figure 2.3-1)

Objective

To restore existing pump chances and helicopter dip ponds for future fire suppression needs.

Desired Future Conditions

To have pump chances and helicopter dip ponds that will hold adequate pools of water, about 500 gallons, to be used primarily for initial attack fire suppression.

Project Design Features

Eight sites have been identified for restoration. The work would include cleaning pump chance pools by excavating gravels, soil, and vegetation that have built up. Excavated materials would be moved to an appropriate disposal site. Water inlets and outlets would be cleaned or repaired and rock would be added to access ramps as needed. Access ramps should have an adequate rock surface and be brushed to accommodate up to 4,000 gallon water tenders. Cascade Frogs would be protected by a seasonal restriction with no restoration occurring from mid-March to August 31.

2.3.2.7 Rock Quarry Closure and Rehabilitation (see Figure 2.3-1)

Objective

To close and rehabilitate rock quarries where the usable rock has been depleted and to minimize erosion from steep side slopes and lack of vegetation.

Desired Future Conditions

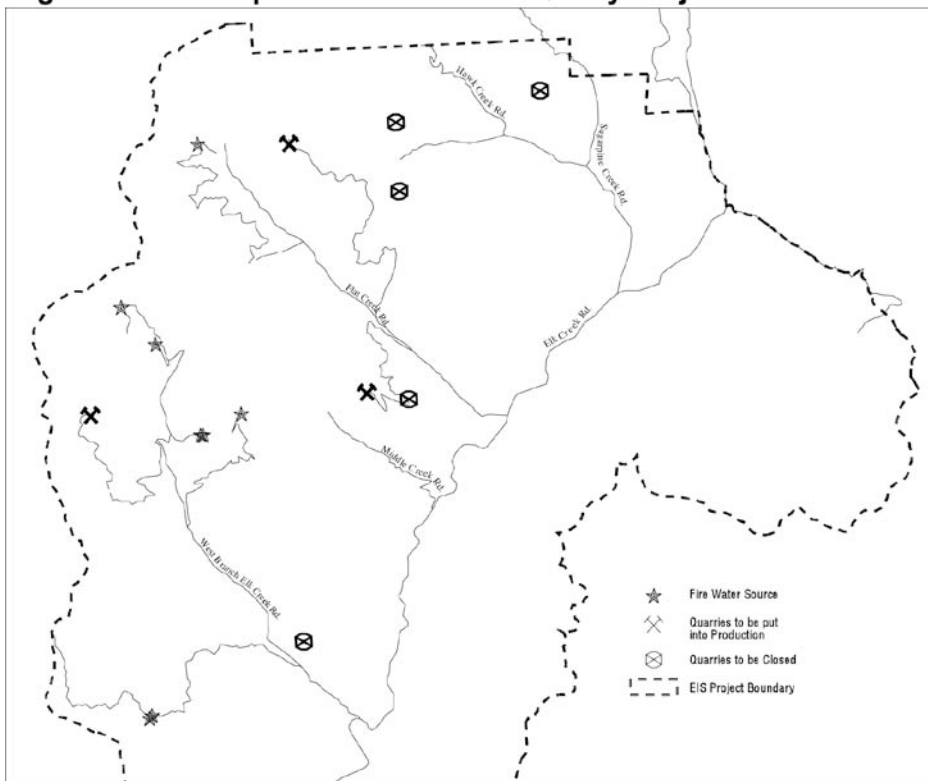
Abandoned rock quarries with vegetation growing in them and blended into the landscape.

Project Design Features

Rock quarries that are no longer viable would have benches sloped, soil imported (if necessary), and vegetation planted. Any oversized or usable material would be stored at the quarry or moved to another location where it would be stored until needed.

Five quarries are proposed for treatment: Gobblers Knob, Elk Horn Creek, Hawk Creek, Old Flat Creek, and West Branch Elk Creek.

Figure 2.3-1. Pump Chance and Rock Quarry Projects



2.4 Alternatives

2.4.1 Alternative A No Action or Continuation of Current Management

2.4.1.1 Salvage Area Salvage

No programmed area salvage.

Salvage of Hazard Trees

Identified hazard trees would be cut. Any salvage of hazardous trees would be determined through additional appropriate NEPA documentation.

2.4.1.2 Restoration

Continue current management under NFP and RMP direction and the Timbered Rock Fire Emergency Stabilization/ Rehabilitation Plan (ESRP). Continue to plan and implement other restoration projects as funding and time permits.

Projects identified in the ESRP:

- Plant trees within fire perimeter (6,000 acres).
- Cancel cattle grazing for 2003 season.
- Survey for and treat noxious weeds along firelines.
- Seed with native grass.
- Seed intensely burned areas greater than 35 percent slope, disturbed areas, meadows, and non-timbered lands.
- Provide structure in stream channels using natural material or construct check dams.
- Add large wood to Hawk, Sugar Pine, Timber, Flat, Middle, Elk, and West Branch Elk creeks and six unnamed tributaries.
- Collect seed to grow native riparian species.
- Plant hardwoods and brush species in Riparian Reserves.

2.4.2 Alternative B No Salvage and Focused Restoration (see Map 2-1f)

2.4.2.1 Salvage

Area Salvage

- No programmed area salvage.

Salvage of Hazard Trees

- Identified hazard trees would be cut. Any salvage

of hazardous trees would be determined through appropriate NEPA documentation.

2.4.2.2 Restoration

Implement a focused level of restoration projects. Emphasis would be placed on reducing non-commercial size vegetative competition in overstocked stands with density management treatments, fuels reduction treatments, and pine habitat restoration. Areas proposed for treatment would be those in most need of competing vegetation reduction. Within the fire perimeter, restoration would focus on high priority road work. LSR restoration actions would focus on non-commercial projects.

Fish Habitat Improvement

- Replace 4 culverts and remove 1 culvert impeding fish passage.
- Install 3 rock weirs per mile.
- Install 15 instream logs per mile.

Vegetation Projects

LSR Forest Habitat Restoration

- Pre-commercial thin 1,102 acres of stands 10-30 years old; greater than 40 percent canopy closure; less than 8" DBH.

Pine Habitat Restoration

- Pre-commercial thin 156 acres of stands with pine 10-30 years old; less than 8" DBH.

Riparian Reserve Thinning

- Thin 117 acres of stands 10-30 years old; 40 percent or greater canopy closure; less than 8" DBH.
- Perennial streams.

Oak Woodlands and Meadow Restoration

- Thin 1,003 acres; less than 8" DBH; underburn.
- Treat high priority areas (outside Timbered Rock Fire perimeter).

Reforestation

- Priority areas for planting:
 1. Pre-fire plantations.
 2. Severely burned areas with slopes greater than 65 percent.
 3. Stand replacement areas greater than 10 acres.
 4. High priority riparian areas (high burn severity areas).
 5. Fifty foot strips along high burn severity fish streams.
- Plant at 10' x10' spacing with microsite emphasis (planting next to logs, stumps, etc.).
- Replant if stocking falls below 100 trees per acre (tpa).
- Plant mixed species.
- Avoid mulching, tubing and shading until replanting.
- Remove competing brush around all seedlings if stocking less than 250 tpa.
- Remove brush around half the trees if stocking greater

than 250 tpa.

Fuels Treatment Projects

Fuel Management Zones (FMZ)

- Treat 1,300 acres along ridgelines 400' outside the LSR and 200' within the LSR.

Owl Activity Center Underburns

- Underburn 425 acres within 4 owl activity centers; 3 within the fire perimeter and 1 outside the fire perimeter but within the LSR.

Fuels Treatment within West Branch Fire

- Cut, pile and burn fire killed trees < 8" within old burn.

Wildlife Projects

Eagle Nesting Habitat Enhancement

- Thin 50 acres; thin thickets of trees 10-30 years old around adjacent meadows to 12'-20' spacing; clear 10'-15' from dripline around existing larger overstory trees.
- Thin trees less than 8" DBH.
- Leave larger cut trees on site.

Log Piles for Wildlife Habitat

- No sites would be developed in this alternative.
- Previously felled trees along Pacific Power powerline in T32S, R1E, Section 5 would be left in place.

Road Projects

Road Reconstruction

- Reconstruct 2.6 miles of road.
- Add drainage structures and rock blankets.

Road Stream-crossing Upgrades

- Upgrade 15 sites at highest risk of fill failure.
- Replace existing culverts to pass 100-year storm event.
- Replace existing road fill with rock fill.

Road Maintenance

- Renovate or improve 77 miles.

Road Decommissioning

- Partial decommission of 2.5 miles of road.
- Full decommission of 33 miles of road.
- Close 21 miles of road with a gate or guardrail barricade.

Seasonal Road Closures

- None.

Pump Chance Restoration

- Restore 8 sites.

Rock Quarry Closure and Rehabilitation

- Close and rehabilitate 5 quarries.

2.4.3 Alternative C South Cascades LSRA Criteria for Salvage and Moderate Restoration (see Map 2-2f)

2.4.3.1 Salvage

Area Salvage

- Salvage 247 acres using guidelines from the South Cascades LSRA (see Appendix B).
- Harvest in stand replacement patches greater than 10 acres; less than 40 percent canopy closure.
- Use small patch clear cuts or group selection – (LSRA example: In a 50-acre unit, ten 5-acre units are preferable to one 50-acre unit).
- Harvest systems would include: cable (123 acres), tractor (21 acres), helicopter (91 acres), and tractor/bull-line (12 acres).
- Construct and rehabilitate .25 miles of temporary road.
- No new permanent roads.
- Roadside hazard acres within available area salvage units would contribute to the salvageable acres of that unit.
- Salvage a minimum of 10 percent and maximum of 20 percent of available acres per stand in stand replacement units where snag densities exceed the median "typical level" (see Appendix B, Table 50 in LSRA). Typical levels are determined by Plant Series. Maximum salvage treatment area would be based on the percent of the existing snag density above this typical level (see Appendix D for stand snag summary).

If Existing snag density,	then Salvage
0 – 10% >typical	10% of the stand replacement acres
11% - 20% >typical	Equal % of stand replacement acres
20% or more >typical	20%

- Follow Landscape Decision Process Criteria (see Appendix B) for each stand.
- Prohibit salvage in the following areas:
 1. Low and very low burned areas (40 percent or greater live canopy).
 2. Riparian areas.
 3. Patches less than 10 acres.
- Retain all pre-fire CWD and snags.

Salvage of Roadside Hazard Trees

- Roadside salvage 1,078 acres.
- Salvage previously felled hazard trees along Pacific

Power powerline in T32S, R1E, Section 5; felled trees in riparian areas, needed to meet CWD requirements, or for log piles for wildlife habitat project would be left.

- BLM would identify and salvage hazard trees along roads or roads needed for post-fire operations except roads within riparian areas and owl activity centers with suitable habitat.
- Hazard trees identified by road users within riparian areas and remaining owl activity centers with suitable habitat would be felled and left in place, except where trees or portions of trees fall within road prism.
- Snag levels would be met within adjacent areas not identified as hazard trees.
- Pre-fire CWD would be left.
- Hazard trees would be identified according to OSHA guidelines (see Appendix D for guidelines).

2.4.3.2 Restoration

Implement moderate level of restoration.

Fish Habitat Improvement

- Replace 4 culverts and remove 1 culvert impeding fish passage.
- Install 5 graveled rock weirs per mile.
- Install 20 logs instream per mile.

Vegetation Treatments

LSR Forest Habitat Restoration

- Pre-commercial thin 912 acres of stands 10-30 years old; less than 8" DBH.
- Commercial thin 479 acres of mid-seral stands 30-80 years old; greater than 8" DBH.
- Treat stands with greater than 70 percent canopy closure.
- Leave CWD level of 5 percent ground cover per acre.
- Commercially remove CWD in stands with an excess of LSRA CWD levels.
- Leave all existing snags.

Pine Habitat Restoration

- Pre-commercial thin 50 acres of pine stands 10-30 years old; less than 8" DBH to encourage pine growth.
- Commercial removal in the following:
Thin 91 acres of mid-seral stands 30-80 years old;
Clear around pine trees greater than 24" and thin on 811 acres of stands over 80 years old.

Riparian Habitat Restoration

- Perennial streams.
- Pre-commercial thin 122 acres of stands 10-30 years old; less than 8" DBH.
- Thin 225 acres of mid-seral stands 30-80 years old; greater than 8" DBH.
- Girdle trees where thinning would result in excessive

fuel loading (greater than 20 tons per acre).

- Place some thinned trees into stream for fish habitat restoration.
- No commercial timber removal.

Oak Woodlands and Meadows Restoration

- Thin 1,554 acres; less than 8" DBH; underburn.
- Treat areas within the watershed, including the Timbered Rock Fire.

Reforestation

- Priority areas for planting:
 1. Pre-fire plantations.
 2. Severely burned areas with slopes greater than 65 percent.
 3. Stand replacement areas greater than 5 acres.
 4. High priority riparian areas (high burn severity areas).
 5. Fifty foot strips along high burn severity fish streams.
- Plant at 10' x 10' spacing using microsite emphasis (planting next to logs, stumps, etc.).
- Replant when stocking falls below 100 tpa.
- Plant mixed species.
- Avoid mulching, tubing, and shading until replanting.
- Remove competing brush around all the seedlings if stocking less than 250 tpa.
- Remove brush around one-half the trees if stocking greater than 250 tpa.

Fuels Treatment Projects

Fuel Management Zones (FMZ)

- Treat up to 1,300 acres along ridgelines; 400' outside the LSR and 200' within the LSR.
- Commercially thin 35 acres; 150' on both side of ridges in T33S, R1W, Sections 14 and 15.

Fuel Treatments within Owl Activity Centers

- Underburn 425 acres within 4 owl activity centers; 3 within the fire perimeter and 1 outside the fire perimeter but within the LSR.

Fuels Treatment within West Branch Fire

- Cut, pile, and burn fire killed trees < 8" within old burn.

Wildlife Projects

Eagle Nesting Habitat Enhancement

- Thin 50 acres; thin thickets of trees 10-30 years old around adjacent meadows to 12'-20' spacing; clear 10'-15' from dripline around existing larger overstory trees; less than 8" DBH.
- Leave larger cut trees on site.

Log Piles for Wildlife Habitat

- Develop 6 sites.
- Logs 16" DBH or greater would be placed in piles 20' x 20' x 5'.

Road Projects

Road Reconstruction

- Reconstruct 2.6 miles of road.
- Add drainage structures and rock blankets.

Road Stream-crossing Upgrades

- Upgrade 11 sites at risk of fill failure.
- Replace existing culverts to pass 100-year storm event.
- Replace existing road fill with rock fill.

Road Maintenance

- Maintain or improve 77 miles of road.

Road Decommissioning

- Partial decommission of 2.5 miles of road.
- Full decommission of 33 miles of road.
- Close 21 miles of road with a gate or guardrail barricade.

Seasonal Road Closures

- None.

Pump Chance Restoration

- Restore 8 sites.

Rock Quarry Closure and Rehabilitation

- Close and rehabilitate 5 quarries.

2.4.4 Alternative D LSR Salvage using DecAID Wood Advisor for Snags and CWD and Moderate Restoration (see Map 2-3f)

2.4.4.1 Salvage

Area Salvage

- Salvage 820 acres.
- Salvage in stand replacement patches greater than 10 acres; less than 40 percent canopy closure.
- Use small patch clear cuts or group selection. Openings created would not exceed 20 acres.
- Use snag and CWD levels from DecAID Wood Advisor (see Appendix D).
- Roadside hazard acres within available area salvage units would contribute to the salvageable acres of those units.
- Harvest systems include: cable (368 acres), tractor (112 acres), helicopter (321 acres), and tractor/bull-line (19 acres).
- Construct and rehabilitate 0.6 miles of temporary road.
- No net gain in permanent roads.
- Prohibit salvage in the following areas:
 1. Low and unburned areas; 40 percent or greater

live canopy.

2. Riparian areas.
3. Patches less than 10 acres in size.
4. Selected owl activity centers in T32S, R1W, Section 1 and T33S, R1W, Section 1.
5. Retain all pre-fire CWD and snags.

Salvage of Roadside Hazard Trees

- Roadside salvage 1,064 acres.
- BLM would identify hazard trees along open roads or roads needed for temporary use for post-fire operations except roads within riparian areas and owl activity centers with suitable habitat
- Salvage identified hazard trees along BLM-administered roads.
- Salvage previously felled hazard trees along Pacific Power powerline in T32S, R1E, Section 5, except for felled trees in riparian areas, needed to meet CWD requirements, or needed for logs for wildlife habitat project.
- Snags levels would be met by snags within adjacent area not identified as hazard trees.
- Leave pre-fire coarse woody debris.
- Hazard trees identified according to OSHA guidelines (see Appendix D for guidelines).
- Hazard trees identified by road users within riparian areas and remaining owl activity centers with suitable habitat would be cut and left in place, except where trees or portions of trees fall within road prism.

2.4.4.2 Restoration

Implement moderate level of restoration.

Fish Habitat Improvement

- Replace 4 culverts and remove 1 culvert impeding fish passage.
- Install 5 graveled rock weirs per mile.
- Install 20 logs instream per mile.

Vegetation Treatments

LSR Forest Habitat Restoration

- Thin a total of 1,391 acres.
- Pre-commercial thin 912 acres of stands 10-30 years old; less than 8" DBH.
- Commercial thin 479 acres of mid-seral stands 30-80 years old; greater than 8" DBH.
- Treat stands with greater than 70 percent canopy closure.
- Leave CWD level of 2 percent ground cover per acre.
- Commercially remove CWD in stands with an excess of DecAID levels.
- Leave all existing snags.

Pine Habitat Restoration

- Pre-commercial thin 50 acres of pine stands 10-30

years old; less than 8" DBH to encourage pine growth.

- Commercial removal in the following:
 - Thin 91 acres of mid-seral stands 30-80 years old;
 - Clear around pine trees greater than 24" and thin on 811 acres of stands over 80 years old.

Riparian Habitat Restoration

- Perennial streams.
- Pre-commercial thin 122 acres of stands 10-30 years old; less than 8" DBH.
- Thin 225 acres of mid-seral stands 30-80 years old; greater than 8" DBH.
- Girdle trees where thinning would result in excessive fuel loading (greater than 20 tons per acre).
- Place some thinned trees into stream for fish habitat restoration.
- No commercial timber removal.

Oak Woodlands and Meadows Restoration

- Thin 1,554 acres; less than 8" DBH; underburn.
- Treat areas within the watershed, including the Timbered Rock Fire.

Reforestation

- Priority areas for planting:
 1. Pre-fire plantations.
 2. Severely burned areas with slopes greater than 65 percent.
 3. Stand replacement areas greater than 5 acres.
 4. High priority riparian areas (high burn severity areas).
 5. Fifty foot strips along high burn severity fish streams.
- Plant at 10' x 10' spacing using microsite emphasis (planting next to logs, stumps, etc.).
- Replant when stocking falls below 100 tpa.
- Plant mixed species.
- Avoid mulching, tubing, and shading until replanting.
- Remove competing brush around all the seedlings if stocking less than 250 tpa.
- Remove brush around one-half the trees if stocking greater than 250 tpa.

Fuels Treatment Projects

Fuel Management Zone (FMZ)

- Treat up to 1,300 acres along ridgelines; 400' outside the LSR and 200' within the LSR.
- Commercially thin 35 acres; 150' on both side of ridges in T33S, R1W, Sections 14 and 15.

Fuel Treatments within Owl Activity Centers

- Underburn 425 acres within 4 owl activity centers; 3 within the fire perimeter and 1 outside the fire perimeter but within the LSR.

Fuels Treatment within West Branch Fire

- Cut, pile, and burn fire-killed trees < 8" within old burn.

Wildlife Projects

Eagle Nesting Habitat Enhancement

- Thin 50 acres; thin thickets of trees 10-30 years old around adjacent meadows to 12'-20' spacing; clear 10'-15' from dripline around existing larger overstory trees; less than 8" DBH.
- Leave larger cut trees on site.

Log Piles for Wildlife Habitat

- Develop 6 sites.
- Place logs 16" DBH or greater in piles 20' x 20' x 5'.

Road Projects

Road Reconstruction

- Reconstruct 2.6 miles of road.
- Add drainage structures and rock blankets.

Road Stream-crossing Upgrades

- Upgrade 11 sites at risk of fill failure.
- Replace existing culverts to pass 100-year storm event.
- Replace existing road fill with rock fill.

Road Maintenance

- Maintain or improve 77 miles of road.

Road Decommissioning

- Partial decommission of 2.5 miles of road.
- Full decommission of 33 miles of road.
- Close 21 miles of road with a gate or guardrail barricade.

Seasonal Road Closures

- None.

Pump Chance Restoration

- Restore 8 sites.

Rock Quarry Closure and Rehabilitation

- Close and rehabilitate 5 quarries.

2.3.5 Alternative E

High Level of Salvage and Extensive Restoration (see Map 2-4f)

2.3.5.1 Salvage

Salvage would be considered in all burn severity levels. This would include areas where stand replacement occurred as well as stands with scattered or clumps of fire-killed trees. Snag levels within the high and moderate severity areas would be based on levels suggested in study by Haggard and Gaines in 2001. This study concluded the highest diversity in cavity nesting species and highest number of nests were found in densities ranged from 6-14 snags per acre.

Area Salvage

- Salvage 3,269 acres.
- Salvage fire-killed trees in all stands (high/moderate/low/unburned severity areas).
- In high and moderate burn severity areas:
 - Leave 8 snags per acre in Douglas-fir plant series.
 - Leave 12 snags per acre in White fir plant series.
 - Snags will be greater than 14" DBH.
- In low and very low burn severity areas, leave 4 snags per acre greater than 14" DBH.
- In all stands, leave minimum of 120 linear feet of CWD per acre greater than 16" DBH.
- Harvest systems include: cable (853 acres), tractor (165 acres), helicopter (2,063 acres), and tractor/bull-line (188 acres).
- Construct and rehabilitate 1.5 miles of temporary road.
- No net increase in permanent roads.
- Prohibit salvage in riparian areas.

Salvage of Roadside Hazard Trees

- Roadside salvage 536 acres.
- BLM would identify hazard trees along open roads or roads needed for temporary use for post-fire operations except within riparian areas and owl activity centers with suitable habitat.
- Salvage previously felled hazard trees along Pacific Power powerline in T32S, R1E, Section 5, except for felled trees in riparian areas, needed to meet CWD requirements, or needed for logs for wildlife habitat project.
- Salvage identified hazard trees along BLM-administered roads.
- Snags levels would be met by snags within adjacent area not identified as hazard trees.
- Leave pre-fire CWD.
- Hazard trees would be identified according to OSHA guidelines (see Appendix D for guidelines).
- Leave identified hazard trees within riparian areas and remaining owl activity centers with suitable habitat except where trees or portions of trees fall within road prism.

2.3.5.2 Restoration

An extensive level of restoration projects would be implemented.

Fish Habitat Improvement

- Replace four culverts impeding fish passage.
- Install 10 graveled rock weirs per mile.
- Install 25 instream logs per mile.

Vegetation Projects

LSR Forest Habitat Restoration

- Pre-commercial thin 1,102 acres of stands 10-30 years old; less than 8" diameter.
- Commercial thin 876 acres of mid-seral stands 30-80 years old; greater than 8" diameter.
- Treat stands with greater than 40 percent canopy closure.
- Commercial removal in stands where CWD levels in excess of 2.0 percent ground cover occurs (DecAID Advisor, see Appendix D).
- All pre-fire snags would be left.

Pine Habitat Restoration

- Pre-commercial thin 156 acres of stands 10-30 years old with pine; less than 8" diameter.
- Commercial removal in these stands:
 - Thin 162 acres of mid-seral stands 30-80 years old;
 - Clear around pine trees greater than 24" and thin on 1,687 acres of stands over 80 years old.

Riparian Habitat Restoration

- All streams.
- Pre-commercial thin 437 acres of stands 10-30 years; less than 8" DBH.
- Thin 613 acres of mid-seral stands 30-80 years old; greater than 8" DBH.
- Girdle trees where thinning results in excessive fuel loading (greater than 20 tons per acre).
- Place some thinned trees into stream for fish habitat restoration.
- No commercial removal.

Oak Woodlands and Meadow Restoration

- Thin 1,544 acres; less than 8" DBH; underburn.
- Treat areas within the watershed, including the Timbered Rock Fire.

Reforestation

- Follow ESRP.
- Plant 6,000 acres.
- Plant hardwoods and brush species in Riparian Reserves.

Fuels Treatment

Creation of Fuel Management Zones (FMZ)

- Treat up to 1,300 acres along ridgelines; 400' outside the LSR and 400' within the LSR.
- Commercially thin 35 acres; 150' on both sides of ridges in T33S, R1W, Sections 14 and 15.

Fuel Treatments in Owl Activity Centers

- Underburn 3 owl activity centers within the Timbered Rock Fire perimeter and 1 center outside the fire perimeter but within the LSR.

Fuels Treatment within West Branch Fire

- Cut, pile, and burn fire killed trees < 8" within old burn.

Wildlife Projects

Eagle Habitat Improvement

- Thin 50 acres to promote growth and development in large trees.
- Clear 10' to 15' from dripline around existing larger overstory trees.
- Thin thickets of younger trees around adjacent meadows to a spacing of 12'-20'.
- Thin trees less than 8" DBH.

Log Piles for Wildlife Habitat

- Develop 6 sites.
- Place logs 16" DBH or greater in piles about 20' x 20' x 5'.

Road Projects

Road Reconstruction

- Reconstruct 2.6 miles of road.
- Add drainage structures and rock blankets.

Road Stream-crossing Upgrades

- Upgrade 26 sites at risk of fill failure.
- Replace culverts to pass 100-year storm event.
- Replace existing road fill with rock fill.

Road Maintenance

- Maintain or improve 115 miles of road.

Road Decommissioning

- Partial decommission of 5.3 miles of road.
- Full decommission of 38 miles of road.
- Close 21 miles of roads with a gate or guardrail barricade.

Seasonal Road Closures

- Approximately 114 miles of seasonal road closures on secondary and non-surfaced roads.
- Closure would be implemented between October 15 through April 30.

Pump Chance Restoration

- Restore 8 sites.

Rock Quarry Closure and Rehabilitation

- Close and rehabilitate 5 quarries.

2.4.6 Alternative F Salvage logging and restoration actions focused only within the Timbered Rock Fire perimeter. (see Map 2-5f)

[NOTE: This alternative is based on a report titled *Recommendations for Ecologically Sound Post-Fire Salvage Management and Other Post-Fire Treatments on Federal Lands in the West* (Beschta, et al. 1995) and offers a number of guidelines regarding salvage of fire-killed trees and post-fire rehabilitation projects. This alternative represents an

interpretation and application of some of those guidelines.]

2.3.6.1 Salvage

Area Salvage

- Salvage 213 acres.
- Salvage pockets of dead trees between 3-10 acres in size located in green stands; leave a minimum of 2 acres untouched within each pocket.
- Snags and CWD levels provided by unsalvaged areas.
- Harvest systems include: cable (46 acres), tractor (29 acres), helicopter (122 acres), and tractor/bull-line (16 acres).
- No net increase in permanent roads.
- No salvage in the following areas:
 1. Clumps of dead trees less than 3 acres or greater than 10 acres
 2. High and moderate burn severity areas
 3. Erosive sites or sites where accelerated erosion is possible
 4. Fragile soils
 5. Steep slopes
 6. Riparian areas

Salvage of Roadside Hazard Trees

- Roadside salvage 1,182 acres.
- BLM would identify hazard trees along open roads or roads needed for temporary use for post-fire operations, except within riparian areas and owl activity centers with suitable habitat.
- Salvage previously felled hazard trees along Pacific Power powerline in T32S, R1E, Section 5, except for felled trees in riparian areas, needed to meet CWD requirements, or needed for logs for wildlife habitat project.
- Salvage of hazard trees along BLM-administered roads.
- Snags levels would be met by snags within adjacent area not identified as hazard trees.
- Only felled hazard trees would be salvaged; pre-fire coarse woody debris would be retained.
- Hazard trees identified according to OSHA guidelines (see Appendix D for guidelines).
- Hazard trees identified by road users within riparian areas and remaining owl activity centers with suitable habitat would be left in place, except where trees or portions of trees fall within road prism.

2.3.6.2 Restoration

The Beschta, et al. report does not address actions outside of a burned area. As a result, no LSR restoration actions are proposed. Restoration within the burn area would be as follows:

Fish Habitat Improvement

- Replace 4 culverts and remove 1 culvert impeding fish passage.
- Install 3 graveled rock weirs per mile.
- Install 25 instream logs per mile.

Vegetation Projects

LSR Habitat Restoration

- None.

Pine Habitat Restoration

- None.

Riparian Habitat Restoration

- None.

Oak Woodlands and Meadow Restoration

- Within fire perimeter, thin 540 acres; less than 8" DBH; underburn.

Reforestation

- Delay planting or seeding for 3 years to determine if natural regeneration is occurring.
- Plant in riparian areas and on slopes greater than 65 percent.
- 10'x10' spacing.

Fuels Treatments

Fuel Modification Zones (FMZ)

- Treat 500 acres of ridgelines within fire perimeter; 200' outside the LSR and 200' within the LSR.

Fuel Treatments within Owl Activity Centers

- Underburn 300 acres in 3 owl activity centers within the Timbered Rock Fire.

Fuels Treatment within West Branch Fire

- Cut, pile, and burn fire killed trees < 8" within old burn.

Wildlife Projects

Eagle Habitat Improvement

- None.

Log Piles for Wildlife Habitat

- Develop 6 sites.
- Place logs 16" DBH or greater in piles about 20' x 20' x 5'.

Road Projects (within fire perimeter)

Road Reconstruction

- Reconstruct 2.6 miles of road.
- Add draining structures and rock blankets.

Road Stream-crossing Upgrades

- Upgrade 26 sites at risk of fill failure.
- Replace culverts to pass 100-year storm event.
- Replace existing road fill with rock fill.

Road Maintenance

- Maintain or improve 68 miles of road.

Road Decommissioning

- Partial decommission of 1.4 miles of road.

- Full decommission of 15.1 miles of road.
- Close 14 miles of roads with a gate or guardrail barricade.

Seasonal Road Closures

- None.

Pump Chance Restoration

- Restore 4 sites.

Rock quarry closure and rehabilitation

- Restore and rehabilitate 5 quarries.

2.4.7 Alternative G (Preferred Alternative) Salvage Based on Research Questions and Salvage in Stand Replacement Units greater than 10 Acres. Moderate Restoration (see Map 2-6f)

2.4.7.1 Salvage

Area Salvage

Two types of area salvage proposed – “research units” and “remaining area.”

1. Research Units

Salvage would be based on responding to research questions revolving around the influences of post-fire salvage and salvage intensities on wildlife species. Snag levels in research units would be based on study design.

- Salvage 328 acres.
- 16 units included in research proposal.
- Units are 30 acres or greater.
- Four treatments levels implemented:
 1. Control – no salvage activity.
 2. Light Salvage – 65% unsalvaged; 35% salvaged leaving 6 snags per acre greater than 20" DBH.
 3. Moderate Salvage – 30% unsalvaged; 70% salvaged leaving 6 snags per acre greater than 20" DBH.
 4. Heavy Salvage – entire site salvaged leaving 6 snags per acre greater than 20" DBH.
- Salvage would occur in 14 acres of riparian reserve
- Harvest systems include: cable (194 acres), tractor (23 acres), and helicopter (111 acres).

2. Remaining Area Salvage

Salvage outside of research units, “remaining area,” would consider salvaging of stand replacement (high and moderate burn severity) areas greater than 10 acres. Snag levels in these units would be based on local and regional references (see Appendix D).

- Salvage 1,051 acres in units greater than 10 acres.
- Leave 8 snags per acre in Douglas-fir plant series.
- Leave 12 snags per acre in White fir plant series.
- Snags will be greater than 14" DBH.
- Harvest systems include: cable (440 acres), tractor (47 acres), helicopter (552 acres), and tractor/bull-line (12 acres).
- Construct and rehabilitate 0.8 miles of temporary road.
- No new permanent roads.
- Prohibit salvage in riparian areas.

Salvage of Roadside Hazard Trees

- Roadside salvage 955 acres.
- BLM would identify hazard trees along open roads or roads needed for temporary use for post-fire operations, except within riparian areas and owl activity centers with suitable habitat
- Salvage previously felled hazard trees along Pacific Power powerline in T32S, R1E, Section 5, except for felled trees in riparian areas, needed to meet CWD requirements, or needed for logs for wildlife habitat project.
- Salvage hazard trees along BLM-administered roads.
- Snag levels would be met by snags within adjacent area not identified as hazard trees.
- Pre-fire coarse woody debris would be retained.
- Hazard trees identified according to OSHA guidelines (see Appendix D for guidelines).
- Hazard trees identified by road users within riparian areas and remaining owl activity centers with suitable habitat would be left in place, except where trees or portions of trees fall within road prism.

2.4.7.2 Restoration

Fish Habitat Improvement

- Remove 1 and replace 4 culverts impeding fish passage.
- Install 5 graveled rock weirs per mile.
- Install 20 instream logs per mile.

Vegetation Projects

LSR Forest Habitat Restoration

- Pre-commercial thin 912 acres of stands 10-30 years old; less than 8" DBH.
- Commercial thin 479 acres of mid-seral stands 30-80 years old; greater than 8" DBH
- Treat stands greater than 70 percent canopy closure.
- Commercial removal in stands in excess of LSRA CWD retention levels.
- Leave all pre-fire snags.

Pine Habitat Restoration

- Pre-commercial thin 50 acres of young pine stands; cut trees less than 8" DBH to encourage pine growth.
- Commercial removal in the following:

Thin 91 acres of mid-seral stands 30-80 years old; Clear around pine trees greater than 24" and thin on 811 acres of stands over 80 years old.

Riparian Habitat Restoration

- Perennial streams.
- Pre-commercial thin 122 acres of stands 10-30 years; less than 8" DBH.
- Thin 225 acres of mid-seral stands 30-80 years old; greater than 8" DBH; no commercial removal.
- Girdle trees where thinning would result in excessive fuel loading (greater than 20 tons per acre).
- Place some thinned trees into stream for fish habitat restoration.

Oak Woodland and Meadow Restoration

- Thin 1,544 acres; less than 8" DBH; underburn.
- Treat areas within and outside the fire perimeter.

Reforestation

- Priority areas for planting:
 1. Pre-fire plantations.
 2. Severely burned areas with slopes greater than 65 percent.
 3. Stand replacement areas greater than 5 acres.
 4. High priority riparian areas (high burn severity areas).
 5. Fifty foot strips along high burn severity fish streams.
- Plant at 10' x 10' spacing with microsite emphasis (planting next to logs, stumps, etc.).
- Replant when stocking falls below 100 tpa.
- Plant mixed species.
- Avoid mulching, tubing, and shading until replanting.
- If stocking less than 250 tpa, remove competing brush around all the seedlings; if stocking greater than 250 tpa, remove brush around one-half the trees.
- Implement Timbered Rock Mixed-species Reforestation Study.

Fuels treatments

Fuel Modification Zones (FMZ)

- Treat 1,300 acres along ridgelines; 400' outside the LSR and 200' within the LSR.
- Commercial thin 35 acres; 150' on both side of ridges in T33S, R1W, Sections 14 and 15.

Fuel Treatments within Owl Activity Centers

- Underburn 425 acres within 4 owl activity centers; 3 within the fire perimeter and 1 outside the fire perimeter but within the LSR.

Fuels Treatment within West Branch Fire

- Cut, pile, and burn fire killed trees < 8" within old burn.

Wildlife Projects

Eagle Habitat Improvement

- Thin 50 acres to promote growth and development in large trees
- Clear 10'-15' from dripline around existing larger overstory trees.

- Thin thickets of younger trees around adjacent meadows to a spacing of 12'-20'.
- Thin trees less than 8" diameter

Log Piles for Wildlife Habitat

- Develop 6 sites.
- Place logs 16" DBH or greater in piles about 20' x 20' x 5'.

Road Projects

Road Reconstruction

- Reconstruct 2.6 miles of road.
- Add drainage structures and rock blankets.

Road Stream-crossing Upgrades

- 11 sites at risk of fill failure.
- Replace culverts to pass 100-year storm event.
- Replace existing road fill with rock fill.

Road Maintenance

- Maintain or improve 77 miles of road.

Road Decommissioning

- Partial decommission of 2.5 miles of road.
- Full decommission of 33 miles of road.
- Close 21 miles of road with a gate or guardrail barricade.

Seasonal Road Closures

- Approximately 114 miles of seasonal road closures on secondary and non-surfaced roads.
- Closure would be implemented between October 15 through April 30.

Pump Chance Restoration

- Restore 8 sites.

Rock Quarry Closure and Rehabilitation

- Close and rehabilitate 5 quarries.

2.5 Range of Reasonable Alternatives

CEQ Regulations (40 CFR 1502.14) require that a reasonable range of alternatives be proposed and the effects of implementing those actions be evaluated. A range of alternatives was obtained by combining various intensities of salvage and late-successional forest restoration projects into alternatives.

By combining six approaches to economic recovery of fire-killed trees (salvage) with four intensity levels for restoration projects, six action alternatives were developed. The six action alternatives, plus the No Action Alternative, resulted in a total of seven different alternatives. Variations between the action alternatives focus primarily on the intensity of treatments rather than the types of treatments.

Options are also presented for reforestation consistent with

overall restoration intensity levels. Alternatives A and E follow the ESRP reforestation guidelines. Alternatives B, C, D, and G more closely follow LSR objectives as opposed to reforestation on matrix lands; i.e. fewer follow-up silviculture treatments, and greater species diversity. Alternative F follows the report from Beschta, et al.

Proposed restoration projects were derived from the South Cascades LSRA, the Elk Creek WA, or developed during preparation of this EIS.

The alternatives for area salvage range from no salvage (Alternatives A and B) to highest level of salvage in Alternative E. Salvage guidance from the NFP for LSRs states "Levels will be 'typical' and will not require retention of all material where it is highly concentrated, or too small to contribute to coarse woody debris over the long timeframes discussed." (USDA and USDI 1994b, C-15). However, the NFP does not define "typical" levels. The No Action Alternative (no salvage) and guidance from the report by Beschta, et al. provide very conservative approaches to salvage in an LSR. The South Cascades LSRA defines typical levels of snags and CWD using a different conservative approach (USDI and USDA 1998, 173). Another level of possible salvage is proposed using an advisory system (from the LSR working group) called "DecAID." A maximum level of salvage is proposed using a higher level or snags and CWD retention than required on Matrix lands. This is lower than what is recommended in LSRA guidance. Finally, in response to numerous questions raised about salvage, a "research alternative" was developed through coordination with a group of Oregon State University (OSU) natural resource scientists. All of the salvage alternatives analyze a higher level of snags and CWD than found in guidelines from State of Oregon Forest Practices Act, which applies to private lands, or guidelines for matrix lands from the NFP. Additional guidelines for developing salvage alternatives are described in Appendix D.

As stated in the LSRA, the approach presented for "area salvage" is a conservative approach to salvage (USDA and USDI 1998, 173). The report from Beschta, et al., represents the approach producing the least amount of salvage, other than no salvage. The decision maker would not have a reasonable range of alternatives from which to choose if guidelines from the South Cascades LSR Assessment were used as the maximum amount of salvage.

2.5.1 Alternatives Considered but Eliminated from Detailed Analysis

During the review of internal and public issues, and development of alternatives, several variations of alternatives were considered by the interdisciplinary team. Of the various alternatives considered, three alternatives were developed but eliminated from detailed study after closer assessment.

2.5.1.1 Roadside Hazard Tree Removal

The importance of public land user safety and the removal of hazard trees along open roads was discussed. The team decided it was not necessary to analyze removal of hazard trees as a stand-alone alternative. Therefore, this alternative was incorporated into all the action alternatives.

2.5.1.2 Do Not Delay Harvest of Dead Trees

Based on public comment, the BLM should proceed with the salvage of fire-killed trees. Many adjacent landowners in the Elk Creek Watershed proposed removing the fire-killed trees immediately in order to recover the value of what was burned and reduce the risk of another fire in the future. There would be less loss of salvageable material due to decay and reforestation efforts could begin sooner. BLM must use the required decision-making process, including preparation of an environmental document and public participation under NEPA for BLM-administered lands. Following these rules and regulations prevents the BLM from immediately implementing an alternative such as this. Therefore, this alternative was dropped from consideration.

2.5.1.3 Consideration of Recommendations for Ecologically Sound Post-Fire Salvage Management and Other Post-fire Treatments on Federal Lands in the West (Beschta, et al. 1995)

The recommendations in this report could not be totally implemented as written. To the extent possible, they were considered and applied in Alternative F. The recommendation to leave all trees greater than 20" DBH was not adopted. Objectives of this EIS are economic recovery as well as LSR restoration. Due to decay, salvage of fire-killed trees 16" DBH or less is not economical in most cases after two years. After three years, these trees are basically unsalvageable. After five years, trees less than 28" DBH lose nearly 40 percent of volume and only the largest trees are consistently salvageable. Due to reduced harvest efficiency, the potential for economic benefit from timber salvage would be lost within 3 years for areas where trees less than 28" DBH are common. By the third year, reassessment of these areas would be required to determine the feasibility of salvage. Areas of consistently larger trees (28" DBH or greater) could remain salvageable for 10 to 15 years but volume losses from decay and drying would continue to occur. Another recommendation from this report was to allow natural recovery. Human intervention should not be permitted unless and until it is determined that natural recovery process are not occurring. An Emergency Stabilization/Rehabilitation Plan (ESRP) was developed immediately after the fire. Recommendation of the ESRP

was to plant the plantations of high burned severity. In spring 2003, 1,000 acres in old plantations were planted. Therefore, these recommendations were not adopted in Alternative F.

2.6 Comparison of Alternatives

Table 2-1 presents in detail the levels of salvage and restoration treatments proposed. More detailed descriptions of the projects can be found in the alternative descriptions in this chapter or in Appendices D and E. Treatment measurements (acres/miles/etc.) are estimates for analytical purposes and actual treatments will vary.

2.7 Summary Comparison of the Effects of the Alternatives

Table 2-2 is a summary of the effects of implementing the alternatives. This summarizes effects on resources and illustrates how the alternatives meet project objectives.

2.8 Cumulative Effects Analysis Summary

Table 2-3 summarizes the important cumulative effects anticipated within the area. Cumulative effects analyses are particularly important in this Draft EIS because of the effects of the wildfire, the anticipated effects of the proposed alternatives, the effects of actions on adjacent industrial forestlands, and the effects of other reasonably foreseeable future actions within the geographic area.

Table 2-1. Comparison of Alternatives

Salvage							
Proposed Projects	Alternative A No Action – Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSR Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta, et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Area Salvage							
Salvage	<ul style="list-style-type: none">• None.	<ul style="list-style-type: none">• None.	<ul style="list-style-type: none">• Salvage in high and moderate burn severity areas >10 acres.• <40% canopy closure.• Salvage no more than 20% of unit.• Small patch clear cuts or group selection.• No salvage in low and very low burn; riparian areas; patches <10 acres, within ¼ mile of predicted active owl sites.	<ul style="list-style-type: none">• Salvage in high and moderate burn severity areas >10 acres.• <40% canopy closure.• Small patch clear cuts or group selection; openings <20 acres.• No salvage in low and very low burn; riparian areas; within ¼ mile of predicted active owl sites.	<ul style="list-style-type: none">• Salvage in high, moderate, low, and very low burn severity areas:• No salvage in riparian areas.	<ul style="list-style-type: none">• Salvage 3-10 acre pockets of dead trees located in green stands.• Leave minimum of 2 acres untouched within each pocket.• No salvage in clumps of dead trees <3 acres or >10 acres, high and moderate burn severity areas, erosive sites, fragile soils, steep slopes, riparian areas, within ¼ mile of predicted active owl sites.	<p>Research units:</p> <ul style="list-style-type: none">• Conduct salvage research in 16 units, ≥30 acre each.• 4 treatment repetitions.▪ Intensive; Salvage entire unit (≈ 14 acres of riparian area could be salvageage).▪ Moderate; reserve 30% of unit.▪ Light; reserve 65% of unit.▪ Control; no salvage. <p>Outside research units:</p> <ul style="list-style-type: none">• Salvage in high and moderate burn severity patches >10 acres.• Salvage in patches <10 acres would occur in and adjacent to FMZ.• No salvage in riparian areas.

Table 2-1. Comparison of Alternatives							
Proposed Projects	Alternative A No Action – Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSR Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta, et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Snag and CWD retention levels			<ul style="list-style-type: none"> • 52 snags/acre in ABCO series. • 29 snags/acre in PSME series. • Retain pre-fire CWD and snags. 	<ul style="list-style-type: none"> • 17snags/acre and 6.7% ground cover in ABCO series. • 8 snags/acre and 3.6% ground cover in PSME series. • Retain pre-fire CWD and snags. 	<p>High and moderate burn area - 1,930 acres.</p> <ul style="list-style-type: none"> • Leave 8 snags/acre PSME. • 12 snags/acre ABCO. • Leave minimum 120' CWD >16" and 16' per acre. <p>Low burn area - 1,339 acres.</p> <ul style="list-style-type: none"> • Leave 4 snags/acre. • Leave minimum 120' CWD >16" and 16' per acre. • Retain pre-fire CWD and snags. 	<ul style="list-style-type: none"> • Snags and CWD provided in unsalvaged areas. 	<p>Research units</p> <ul style="list-style-type: none"> • Leave 6 snags/acre in salvaged portion. • Leave minimum 120" CWD >16" and 16' per acres in salvaged portion. <p>Outside research units</p> <ul style="list-style-type: none"> • Leave 8 snags/acre and 2.0% ground cover in PSME. • Leave 12 snags/acre and 3.6% ground cover in ABCO. • Retain pre-fire CWD and snags.
Harvest systems			<ul style="list-style-type: none"> • On 247 acres: 123 acres cable; 21 acres tractor; 12 acres bull-line; 91 acres helicopter. 	<ul style="list-style-type: none"> • On 820 acres: 368 acres cable; 112 acres tractor; 19 acres bull-line; 321 acres helicopter. 	<ul style="list-style-type: none"> • On 3,269 acres: 853 acres cable; 165 acres tractor; 188 acres bull-line; 2,063 acres helicopter 	<ul style="list-style-type: none"> • On 213 acres: 46 acres cable; 29 acres tractor; 16 acres bull-line; 122 acres helicopter 	<p>Research units</p> <ul style="list-style-type: none"> • On 328 acres: 194 acres cable; 23 acres tractor; 111 acres helicopter. <p>Outside research units</p> <ul style="list-style-type: none"> • On 1,051 acres: 440 acres cable; 47 acres tractor; 552 acres helicopter; 12 acres bull-line.

Road construction			<ul style="list-style-type: none"> • 0.25 miles of temporary road. • No new permanent roads. 	<ul style="list-style-type: none"> • 0.6 miles of temporary roads. • No new permanent roads. 	<ul style="list-style-type: none"> • 1.5 miles of temporary road. • No new permanent roads. 	<ul style="list-style-type: none"> • No new temporary roads. • No new permanent roads. 	<ul style="list-style-type: none"> • No new temporary roads in research units. • 0.8 miles temporary roads outside. • No new permanent roads.
Roadside Salvage							
	<ul style="list-style-type: none"> • None. • Hazard trees identified by adjacent landowners and contractors would be cut. • Salvage only after additional NEPA. 	<ul style="list-style-type: none"> • None. • Hazard trees identified by adjacent landowners and contractors would be cut. • Salvage only after additional NEPA. 	<ul style="list-style-type: none"> • 1,078 acres bull-line. • Salvage hazard trees along BLM roads. • Hazard trees in riparian areas and owl activity centers with suitable habitat would not be salvaged unless felled within the road. • Retain pre-fire CWD. 	<ul style="list-style-type: none"> • 1,064 acres bull-line. • Salvage hazard trees along BLM roads. • Hazard trees in riparian areas and owl activity centers with suitable habitat would not be salvaged unless felled within the road. • Retain pre-fire CWD. 	<ul style="list-style-type: none"> • 536 acres bull-line. • Salvage hazard trees along BLM roads. • Hazard trees in riparian areas and owl activity centers with suitable habitat would not be salvaged unless felled within the road. • Retain pre-fire CWD. 	<ul style="list-style-type: none"> • 1,182 acres bull-line. • Salvage hazard trees along BLM roads. • Hazard trees in riparian areas and owl activity centers with suitable habitat would not be salvaged unless felled within the road. • Retain pre-fire CWD. 	<ul style="list-style-type: none"> • 955 acres bull-line. • Salvage hazard trees along BLM roads. • Hazard trees in riparian areas and owl activity centers with suitable habitat would not be salvaged unless felled within the road. • Retain pre-fire CWD.
Restoration							
Fish Habitat Improvement							
Culvert Replacement for fish passage		<ul style="list-style-type: none"> • Remove 1 culvert. • Replace 4 culverts. 	<ul style="list-style-type: none"> • Remove 1 culvert. • Replace 4 culverts. 	<ul style="list-style-type: none"> • Remove 1 culvert. • Replace 4 culverts. 	<ul style="list-style-type: none"> • Remove 1 culvert. • Replace 4 culverts. 	<ul style="list-style-type: none"> • Remove 1 culvert. • Replace 4 culverts. 	<ul style="list-style-type: none"> • Remove 1 culvert. • Replace 4 culverts.
Fish Structures (8 miles)		<ul style="list-style-type: none"> • 3 rock weirs/mile. • Add gravel above each weir. • Place 15 logs/mile. 	<ul style="list-style-type: none"> • 5 rock weirs/mile. • Add gravel above each weir. • Place 20 logs/mile. 	<ul style="list-style-type: none"> • 5 rock weirs/mile. • Add gravel above each weir. • Place 20 logs/mile. 	<ul style="list-style-type: none"> • 10 rock weirs/mile. • Add gravel above each weir. • Place 25 logs/mile. 	<ul style="list-style-type: none"> • 3 rock weirs/mile. • Add gravel above each weir. • Place 25 logs/mile. 	<ul style="list-style-type: none"> • 5 rock weirs/mile. • Add gravel above each weir. • Place 20 logs/mile.

Table 2-1. Comparison of Alternatives

Table 2-1. Comparison of Alternatives							
Proposed Projects	Alternative A No Action – Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSR Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta, et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Vegetation Treatments							
Late- Successional Forest Habitat Restoration • Stands 10-30 years old		<ul style="list-style-type: none"> • Thin 1,102 acres. • Trees <8" DBH. • With >40% canopy closure. 	<ul style="list-style-type: none"> • Thin 912 acres. • Trees <8" DBH. • With >70% canopy closure. 	<ul style="list-style-type: none"> • Thin 912 acres. • Trees <8" DBH. • With >70% canopy closure. 	<ul style="list-style-type: none"> • Thin 1,102 acres • Trees <8" DBH • With >40% canopy closure 	<ul style="list-style-type: none"> • None 	<ul style="list-style-type: none"> • Thin 912 acres • Trees <8" DBH • With >70% canopy closure
Late- Successional Forest Habitat Restoration • Stands 30-80 years old			<ul style="list-style-type: none"> • Thin 479 acres. • Trees <20" DBH • With >70% canopy closure. • CWD retention level equals 5% ground cover. • Harvest thinned trees in excess of CWD levels. • Leave pre-fire snags and CWD. • Harvest systems; 96 acres tractor; 144 acres cable; 239 acres helicopter. 	<ul style="list-style-type: none"> • Thin 479 acres. • Trees <20" DBH. • With >70% canopy closure. • CWD retention level equals 2% ground cover. • Harvest thinned trees in excess of CWD levels. • Leave pre-fire snags and CWD. • Harvest systems; 96 acres tractor; 144 acres cable; 39 acres helicopter. 	<ul style="list-style-type: none"> • Thin 876 acres. • Trees <20" DBH. • With >40% canopy closure. • CWD retention level equals 2% ground cover. • Harvest thinned trees in excess of CWD levels. • Leave pre-fire snags and CWD. • Harvest systems; 219 acres tractor; 237 acres cable; 420 acres helicopter. 	<ul style="list-style-type: none"> • None. 	<ul style="list-style-type: none"> • Thin 479 acres. • Trees <20" DBH • With >70% canopy closure • CWD retention level equals 2% ground cover. • Harvest thinned trees in excess of CWD levels. • Leave pre-fire snags and CWD. • Harvest systems; 96 acres tractor; 144 acres cable; 39 acres helicopter.

Pine Restoration • Stands 10-30 years old with mixed pine	• Thin 156. • Trees <8" DBH.	• Thin 50 acres. • Trees <8" DBH.	• Thin 50 acres. • Trees <8" DBH.	• Thin 156 acres. • Trees <8" DBH.	• None.	• Thin 50 acres. • Trees <8" DBH.
Pine Restoration • Stands 30-80 years old		• Thin 91 acres. • Harvest thinned trees. • CWD retention level equals 2% ground cover. • Leave pre-fire snags and CWD.	• Thin 91 acres. • Harvest thinned trees. • CWD retention level equals 2% ground cover. • Leave pre-fire snags and CWD.	• Thin 162 acres. • Harvest thinned trees. • CWD retention level equals 2% ground cover. • Leave pre-fire snags and CWD	• None	• Thin 91 acres. • Harvest thinned trees • CWD retention level equals 2% ground cover. • Leave pre-fire snags and CWD.
Pine Restoration • Stands 80+ years old		• Thin and clear around 811 acres of pines >24" DBH. • Harvest cut trees. • CWD retention level equals 2% ground cover • Leave pre-fire snags and CWD. • Harvest Systems; 90 acres tractor; 812 acres helicopter.	• Thin and clear around 811 acres of pines >24" DBH. • Harvest cut trees. • CWD retention level equals 2% ground cover. • Leave pre-fire snags and CWD. • Harvest Systems; 90 acres tractor; 812 acres helicopter.	• Thin and clear around 1,687 acres of pines >24" DBH. • Harvest cut trees. • CWD retention level equals 2% ground cover. • Leave pre-fire snags and CWD. • Harvest Systems; 203 acres tractor; 1,649 acres helicopter.	• None.	• Thin and clear around 811 acres of pines >24" DBH. • Harvest cut trees. • CWD retention level equals 2% ground cover. • Leave pre-fire snags and CWD. • Harvest Systems; 90 acres tractor; 812 acres helicopter.
Riparian Reserve Thinning • Stands 10-30 years old	• Thin 117 acres. • Perennial streams only. • Trees <8" DBH.	• Thin 122 acres. • Perennial streams only. • Trees < 8" DBH.	• Thin 122 acres. • Perennial streams only. • Trees < 8" DBH.	• Thin 437 acres. • All streams. • Trees <8" DBH.	• None.	• Thin 122 acres. • Perennial streams only. • Trees <8" DBH.

Table 2-1. Comparison of Alternatives

Table 2-1. Comparison of Alternatives							
Proposed Projects	Alternative A No Action – Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSR Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta, et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Riparian Reserve Thinning • Stands 30-80 years old			<ul style="list-style-type: none"> • Thin 225 acres. • Trees <20" DBH. • >40% canopy closure. • Hand pile slash and girdle trees to limit fuel loads to 20 tons/acre or less. 	<ul style="list-style-type: none"> • Thin 225 acres. • Trees <20" DBH. • >40% canopy closure. • Hand pile slash and girdle trees to limit fuel loads to 20 tons/acre or less. 	<ul style="list-style-type: none"> • Thin 613 acres • Trees <20" DBH. • >40% canopy closure. • Hand pile slash and girdle trees to limit fuel loads to 20 tons/acre or less. 		<ul style="list-style-type: none"> • Thin 225 acres. • Trees <20" DBH. • >40% canopy closure. • Hand pile slash and girdle trees to limit fuel loads to 20 tons/acre or less.
Oak Woodland and Meadow		Thin 1,003 acres: • <8" DBH. • Underburn.	Thin 1,544 acres: • <8" DBH. • Underburn.	Thin 1,544 acres: • <8" DBH. • Underburn.	Thin 1,544 acres: • <8" DBH. • Underburn.	Thin 540 acres: • <8" DBH • Underburn.	Thin 1,544 acres: • <8" DBH. • Underburn.

Reforestation	<ul style="list-style-type: none"> • 6,000 acres. • 10'x10' spacing. • 430 tpa. • Planting as analyzed in ESRP. 	<ul style="list-style-type: none"> • 3,016 acres. • Approximately 10'x10' spacing with microsite emphasis. • 430 tpa. • Replant if stocking level drops below 100 tpa. • Mixed species. • No mulching, tubing, or shading until replant. • Remove brush around ½ seedlings. 	<ul style="list-style-type: none"> • 3,176 acres. • Approximately 10'x10' spacing with microsite emphasis. • 430 tpa. • Replant if stocking level drops below 100 tpa. • Mixed species. • No mulching, tubing, or shading until replant. • Remove brush around ½ the seedlings if stocking is >250 tpa. • Remove brush around all of the seedlings if stocking <250 tpa. 	<ul style="list-style-type: none"> • 6,000 acres. • 10'x10' spacing. • 430 tpa. • Planting as analyzed in ESRP. 	<ul style="list-style-type: none"> • 1,045 acres. • Approximately 10'x10' spacing with microsite emphasis. • 430 tpa. • Plant only in riparian areas and slopes >65%. • Reevaluate after 3 years and replant if natural regeneration is not occurring. 	<ul style="list-style-type: none"> • 3,176 acres. • Approximately 10'x10' spacing with microsite emphasis. • 430 tpa. • Replant if stocking level drops below 100 tpa. • Mixed species. • No mulching, tubing, or shading until replant. • Remove brush around ½ the seedlings if stocking is >250 tpa. • Remove brush around all the seedlings if stocking < 250 tpa. <p>Research Planting</p> <ul style="list-style-type: none"> • 75-90 acres planted. • Mixed species. • Mixed planting densities. • Varied vegetation treatment.
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Table 2-1. Comparison of Alternatives

Table 2-1. Comparison of Alternatives							
Proposed Projects	Alternative A No Action – Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSR Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta, et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Fuels Treatments							
Fuel Management Zones (FMZ)	<ul style="list-style-type: none">• 1,300 acres.• 400' outside LSR; 200' within LSR.	<ul style="list-style-type: none">• 1,300 acres.• 400' outside LSR; 200' within LSR.• FMZs within the fire includes salvage of patches less than 10 acres in size.• Commercial thin 62 acres;▪ 150' on each side of ridge line in T33S, R1W, Sec. 14 and 15.	<ul style="list-style-type: none">• 1,300 acres.• 400' outside LSR; 200' within LSR.• FMZs within the fire includes salvage of patches less than 10 acres in size.• Commercial thin 62 acres;▪ 150' on each side of ridge line in T33S, R1W, Sec. 14 and 15.	<ul style="list-style-type: none">• 1,300 acres.• 400' outside LSR; 200' within LSR.• FMZs within the fire includes salvage of patches less than 10 acres in size.• Commercial thin 62 acres;▪ 150' on each side of ridge line in T33S, R1W, Sec. 14 and 15.	<ul style="list-style-type: none">• 500 acres.• 200' outside LSR; 200' within LSR.• FMZs within the fire includes salvage of patches less than 10 acres in size.	<ul style="list-style-type: none">• 1,300 acres.• 400' outside LSR; 200' within LSR.• FMZs within the fire includes salvage of patches less than 10 acres in size.• Commercial thin 62 acres;▪ 150' on each side of ridge line in T33S, R1W, Sec. 14 and 15.	
Fuel Treatments within Owl Activity Centers	<ul style="list-style-type: none">• 425 acres within 4 owl activity centers.	<ul style="list-style-type: none">• 425 acres within 4 owl activity centers.	<ul style="list-style-type: none">• 425 acres within 4 owl activity centers.	<ul style="list-style-type: none">• 425 acres within 4 owl activity centers.	<ul style="list-style-type: none">• 425 acres within 4 owl activity centers.	<ul style="list-style-type: none">• 300 acres within 3 owl activity centers.	<ul style="list-style-type: none">• 425 acres within 4 owl activity centers.
Fuels Treatment within old West Branch Fire	<ul style="list-style-type: none">• 70 acres.	<ul style="list-style-type: none">• 70 acres.	<ul style="list-style-type: none">• 70 acres.	<ul style="list-style-type: none">• 70 acres.	<ul style="list-style-type: none">• 70 acres.	<ul style="list-style-type: none">• None.	<ul style="list-style-type: none">• 70 acres.

Wildlife Projects					
Eagle Nesting Habitat	<ul style="list-style-type: none"> Thin and clear around selected overstory trees on 50 acres. 	<ul style="list-style-type: none"> Thin and clear around selected overstory trees on 50 acres. 	<ul style="list-style-type: none"> Thin and clear around selected overstory trees on 50 acres. 	<ul style="list-style-type: none"> Thin and clear around selected overstory trees on 50 acres. 	<ul style="list-style-type: none"> Thin and clear around selected overstory trees on 50 acres.
Log Piles for Wildlife Habitat	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> 6 sites. Piles of logs 20'x20' and 4'-6' high. 	<ul style="list-style-type: none"> 6 sites. Piles of logs 20'x20' and 4'-6' high. 	<ul style="list-style-type: none"> 6 sites. Piles of logs 20'x20' and 4'-6' high. 	<ul style="list-style-type: none"> 6 sites Piles of logs 20'x20' and 4'-6' high.
Road Projects					
Reconstruction	<ul style="list-style-type: none"> 2.6 miles. Add drainage structures and rock blankets. 	<ul style="list-style-type: none"> 2.6 miles. Add drainage structures and rock blankets. 	<ul style="list-style-type: none"> 2.6 miles. Add drainage structures and rock blankets. 	<ul style="list-style-type: none"> 2.6 miles. Add drainage structures and rock blankets. 	<ul style="list-style-type: none"> 2.6 miles. Add drainage structures and rock blankets.
Stream Crossing Upgrades	<ul style="list-style-type: none"> 15 sites. Replace culverts to pass 100-year storm event. Replace existing road fill material with rock. 	<ul style="list-style-type: none"> 11 sites. Replace culverts to pass 100-year storm event. Replace existing road fill material with rock. 	<ul style="list-style-type: none"> 26 sites. Replace culverts to pass 100-year storm event. Replace existing road fill material with rock. 	<ul style="list-style-type: none"> 26 sites. Replace culverts to pass 100-year storm event. Replace existing road fill material with rock. 	<ul style="list-style-type: none"> 11 sites. Replace culverts to pass 100-year storm event. Replace existing road fill material with rock.
Maintenance	<ul style="list-style-type: none"> 77 miles. 	<ul style="list-style-type: none"> 77 miles. 	<ul style="list-style-type: none"> 115 miles. 	<ul style="list-style-type: none"> 68 miles. 	<ul style="list-style-type: none"> 77 miles.
Decommission	<ul style="list-style-type: none"> 36 miles of partial or full decommission 	<ul style="list-style-type: none"> 36 miles of partial or full decommission. 	<ul style="list-style-type: none"> 43 miles of partial or full decommission. 	<ul style="list-style-type: none"> 17 miles of partial or full decommission. 	<ul style="list-style-type: none"> 36 miles of partial or full decommission.
Road Closures	<ul style="list-style-type: none"> 21 miles of road closed. 16 gates or barricades. 	<ul style="list-style-type: none"> 21 miles of road closed. 16 gates or barricades. 	<ul style="list-style-type: none"> 21 miles of road closed. 16 gates or barricades. 	<ul style="list-style-type: none"> 14 miles of road closed. 11 gates or barricades. 	<ul style="list-style-type: none"> 21 miles of road closed. 16 gates or barricades.
Seasonal Closures	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Seasonally Close 114 miles of secondary and native surface roads from mid-October to Apr. 30 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Seasonally Close 114 miles of secondary and native surface roads from mid-October to April 30.

Table 2-1. Comparison of Alternatives

Table 2-1. Comparison of Alternatives

Proposed Projects	Alternative A No Action – Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSR Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta, et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Pump Chance Reconstruction	<ul style="list-style-type: none"> • 8 sites. • Clean material from pool area. • Clean or repair inlets and outlets. • Improve access. 	<ul style="list-style-type: none"> • 8 sites. • Clean material from pool area. • Clean or repair inlets and outlets. • Improve access. 	<ul style="list-style-type: none"> • 8 sites. • Clean material from pool area. • Clean or repair inlets and outlets. • Improve access. 	<ul style="list-style-type: none"> • 8 sites. • Clean material from pool area. • Clean or repair inlets and outlets. • Improve access. 	<ul style="list-style-type: none"> • 8 sites. • Clean material from pool area. • Clean or repair inlets and outlets. • Improve access. 	<ul style="list-style-type: none"> • 4 sites • Clean material from pool area • Clean or repair inlets and outlets • Improve access. 	<ul style="list-style-type: none"> • 8 sites. • Clean material from pool area. • Clean or repair inlets and outlets. • Improve access.
Rock Quarry Closure and Rehabilitation	<ul style="list-style-type: none"> • 5 sites. • Slope benches and plant vegetation. 	<ul style="list-style-type: none"> • 5 sites. • Slope benches and plant vegetation. 	<ul style="list-style-type: none"> • 5 sites. • Slope benches and plant vegetation. 	<ul style="list-style-type: none"> • 5 sites. • Slope benches and plant vegetation. 	<ul style="list-style-type: none"> • 5 sites. • Slope benches and plant vegetation. 	<ul style="list-style-type: none"> • 5 sites. • Slope benches and plant vegetation. 	<ul style="list-style-type: none"> • 5 sites. • Slope benches and plant vegetation.

Table 2-2. Summary of the Effects of the Alternatives

Proposed Projects	Alternative A No Action - Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSRA Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta, et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Recovery of the Economic Value of Fire-Killed Trees (Salvage)							
Volume of salvage recovered	• None.	• None.	• 8.6 mmbf	• 21.0mmbf	• 29.4mmbf	• 8.0mmbf	• 21.8mmbf
Revenue per mbf	• \$0.0	• \$0.0	• \$225	• \$209	• \$184	• \$229	• \$192
Expected receipts from timber sale	• None.	• None.	• \$1.9 million	• \$4.4 million	• \$5.4 million	• \$1.8 million	• \$4.2 million
Value of salvage to Regional Economy	• None.	• None.	• \$7.4 million	• \$18.1 million	• \$25.2 million	• \$6.9 million	• \$18.8 million
Direct jobs attributed to salvage	• None.	• None.	• 81	• 199	• 277	• 76	• 206
Total direct and indirect jobs to regional economy from salvage	• None.	• None.	• 130	• 318	• 443	• 121	• 330
Economic Value of Restoration Projects							
Pine Release and LSR Thinnings							
Volume of harvest from vegetation treatments	• None.	• None.	• 2.8 mmbf	• 2.8 mmbf	• 5.5 mmbf	• None.	• 2.8 mmbf
Cost of harvesting vegetation treatments	• None.	• None.	• \$186,600	• \$186,600	• \$362,000	• None	• \$186,600

Table 2-2. Summary of the Effects of the Alternatives

Table 2-2. Summary of the Effects of the Alternatives							
Proposed Projects	Alternative A No Action - Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSRA Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Total direct and indirect jobs from late-successional forest restoration	• None.	• None.	• 41	• 41	• 83	• None	• 41
Road improvements, reforestation, fuel management zones, fish structures, eagle nests, oak woodland treatments, and other restoration projects							
Cost of projects	• \$3,400,000	• \$5,300,000	• \$6,300,000	• \$6,300,000	• \$8,800,000	• \$3,100,000	• \$6,300,000
Total direct and indirect jobs created, from above restoration projects	• 122	• 146	• 174	• 174	• 242	• 84	• 174
Total direct and indirect jobs created, all restoration projects	• 122	• 146	• 215	• 215	• 325	• 84	• 215
Cost of Research							
Reforestation	• \$0	• \$0	• \$0	• \$0	• \$0	• \$0	• \$320,000 over 8 years.
Wildlife/snags	• \$0	• \$0	• \$0	• \$0	• \$0	• \$0	• \$400,000 over 10 years

Fuel Loading Within the Elk Creek Watershed							
Acres of FMZs	<ul style="list-style-type: none"> No reduction in fuel profiles. 	<ul style="list-style-type: none"> 1,300 acres of fuel hazard reduction and fuel profile modification. Reduce fire intensity and size of future fires throughout LSR. 	<ul style="list-style-type: none"> 1,300 acres of fuel hazard reduction and fuel profile modification. Reduce fire intensity and size of future fires throughout LSR. 	<ul style="list-style-type: none"> 1,300 acres of fuel hazard reduction and fuel profile modification. Reduce fire intensity and size of future fires throughout LSR. 	<ul style="list-style-type: none"> 1,300 acres of fuel hazard reduction and fuel profile modification. Reduce fire intensity and size of future fires throughout LSR. 	<ul style="list-style-type: none"> 500 acres of fuel hazard reduction and fuel profile modification. Reduce fire intensity and size of future fires only within fire perimeter. 	<ul style="list-style-type: none"> 1,300 acres of fuel hazard reduction and fuel profile modification. Reduce fire intensity and size of future fires throughout LSR.
Protection to wildland urban interface and industrial forestland	<ul style="list-style-type: none"> No additional protection to wildland urban interface and industrial forestland. 	<ul style="list-style-type: none"> Reduce fire intensity and severity on 4,090 acres of hazardous fuels. Provides additional protection to 30,700 acres within WUI. 	<ul style="list-style-type: none"> Reduce fire intensity and severity on 5,557 acres of hazardous fuels. Provides additional protection to 30,700 acres within WUI. 	<ul style="list-style-type: none"> Reduce fire intensity and severity on 5,557 acres of hazardous fuels. Provides additional protection to 30,700 acres within WUI. 	<ul style="list-style-type: none"> Reduce fire intensity and severity on 6,914 acres of hazardous fuels. Provides additional protection to 30,700 acres within WUI. 	<ul style="list-style-type: none"> Reduce fire intensity and severity on 1,340 acres of hazardous fuels. Provides minimal protection to 30,700 acres within WUI. 	<ul style="list-style-type: none"> Reduce fire intensity and severity on 5,557 acres of hazardous fuels Provides additional protection to 30,700 acres within WUI.
Protection to remaining LSR habitat	<ul style="list-style-type: none"> No additional protection to remaining late-successional habitat. 	<ul style="list-style-type: none"> 3,088 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 4,013 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 4,013 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 5,360 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> No treatment. 	<ul style="list-style-type: none"> 4,013 acres of fuel hazard reduction and fuel profile modification.
Underburning of oak woodlands and owl centers	<ul style="list-style-type: none"> Continued encroachment to oak woodlands. Remains high fire hazard. 	<ul style="list-style-type: none"> 1,428 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 1,969 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 1,969 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 1,969 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 840 acres of fuel hazard reduction and fuel profile modification. 	<ul style="list-style-type: none"> 1,969 acres of fuel hazard reduction and fuel profile modification.
Coarse Woody Debris (CWD) and Snags							
Fire-killed trees ($\geq 8"$ DBH) removed or retained in fire area	<ul style="list-style-type: none"> Retained: 347,303 trees (100%). 	<ul style="list-style-type: none"> Retained: 347,303 trees (100%). 	<ul style="list-style-type: none"> Retained: 17,148 trees. Retained: 330,115 trees (95%). 	<ul style="list-style-type: none"> Retained: 42,529 trees. Retained: 304,774 trees (88%). 	<ul style="list-style-type: none"> Retained: 65,794 trees. Retained: 281,509 trees (81%). 	<ul style="list-style-type: none"> Retained: 15,481 trees. Retained: 331,822 trees (96%). 	<ul style="list-style-type: none"> Removed: 45,961 trees. Retained: 301,342 trees (87%).

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	Alternative A No Action - Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSRA Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Stand replacement acres not salvaged	• 2,586 acres (100%).	• 2,586 acres (100%)	• 2,339 acres (90%).	• 1,766 acres (68%).	• 656 acres (25%).	• 2,373 acres (92%).	• 1,207 acres (47%).
Acceleration of Late-Successional Forest Habitat Characteristics							
Treatment of young stands	• No change. • Slower development of late-successional habitat.	• Accelerate development of late-successional habitat on 1,258 acres.	• Accelerate development of late-successional habitat on 962 acres.	• Accelerate development of late-successional habitat on 962 acres.	• Accelerate development of late-successional habitat on 1,258 acres.	• No change. • Slower development of late-successional habitat.	• Accelerate development of late-successional habitat on 962 acres.
Treatment of mid- seral stands	• No change. • Slower development of late-successional habitat.	• Slower development of late-successional habitat.	• Accelerate development of late-successional habitat on 570 acres.	• Accelerate development of late-successional habitat on 570 acres.	• Accelerate development of late-successional habitat on 1,038 acres.	• No change. • Slower development of late-successional habitat.	• Accelerate development of late-successional habitat on 570 acres.
Treatment of 80+ year old pine stands	• No change.	• No change.	• Increase resiliency to fire and maintain pine in late- successional stands on 902 acres.	• Increase resiliency to fire and maintain pine in late- successional stands on 902 acres.	• Increase resiliency to fire and maintain pine in late- successional stands on 1,749 acres.	• No change.	• Increase resiliency to fire and maintain pine in late- successional stands on 902 acres.
Thinning and burning of oak woodlands and meadows	• No restoration. • Areas continue to decline.	• Increased vigor and resiliency of oak woodlands and meadows on 1,003 acres within fire perimeter. • Continued decline outside of fire perimeter.	• Increased vigor and resiliency of oak woodlands and meadows on 1,554 acres throughout LSR.	• Increased vigor and resiliency of oak woodlands and meadows on 1,554 acres throughout LSR.	• Increased vigor and resiliency of oak woodlands and meadows on 1,554 acres throughout LSR.	• Increased vigor and resiliency of oak woodlands and meadows on 540 acres within fire perimeter. • Continued decline outside of fire perimeter.	• Increased vigor and resiliency of oak woodlands and meadows on 1,554 acres throughout LSR.

Reforestation	<ul style="list-style-type: none"> Maximum conifer establishment on 6,000 acres across fire area. 	<ul style="list-style-type: none"> 3,016 acres planted. Expedite conifer establishment on high and moderate burn severity areas. More gap effect. 	<ul style="list-style-type: none"> 3,176 acres planted. Expedite conifer establishment on high and moderate burn severity areas. More gap effect. 	<ul style="list-style-type: none"> 3,176 acres planted. Expedite conifer establishment on high and moderate burn severity areas. More gap effect. 	<ul style="list-style-type: none"> 3,176 acres planted. Expedite conifer establishment on high and moderate burn severity areas. More gap effect. 	<ul style="list-style-type: none"> Maximum conifer establishment on 6,000 acres planted across fire area. 	<ul style="list-style-type: none"> Reforestation only on most critical 1,045 acres. Remainder; no reforestation for 3 years and then reevaluate. Slowest development of late-successional forest. 	<ul style="list-style-type: none"> 3,176 acres planted. Expedite conifer establishment on high and moderate burn severity areas. More gap effect. Research to better understand reforestation effects.
Riparian Reserve reforestation	<ul style="list-style-type: none"> Maximize conifer establishment in Riparian Reserves. 	<ul style="list-style-type: none"> Establish a more biological diverse mix of riparian vegetation. 	<ul style="list-style-type: none"> Establish a more biological diverse mix of riparian vegetation. 	<ul style="list-style-type: none"> Establish a more biological diverse mix of riparian vegetation. 	<ul style="list-style-type: none"> Establish a more biological diverse mix of riparian vegetation. 	<ul style="list-style-type: none"> Maximize conifer establishment in Riparian Reserves 	<ul style="list-style-type: none"> Establish a more biological diverse mix of riparian vegetation. 	<ul style="list-style-type: none"> Establish a more biological diverse mix of riparian vegetation.
Riparian Reserve restoration thinning	<ul style="list-style-type: none"> No treatments. Slower development of late-successional forest conditions. 	<ul style="list-style-type: none"> Faster development of late-successional forest conditions on 117 acres treated. Girdling of trees provides a sustained pulse of snags/CWD. 	<ul style="list-style-type: none"> Faster development of late-successional forest conditions on 347 acres treated. Girdling of trees provides a sustained pulse of snags/CWD. 	<ul style="list-style-type: none"> Faster development of late-successional forest conditions on 347 acres treated. Girdling of trees provides a sustained pulse of snags/CWD. 	<ul style="list-style-type: none"> Faster development of late-successional forest conditions on 347 acres treated. Girdling of trees provides a sustained pulse of snags/CWD. 	<ul style="list-style-type: none"> Faster development of late-successional forest conditions on 1,050 acres treated. Girdling of trees provides a sustained pulse of snags/CWD. 	<ul style="list-style-type: none"> No treatments. Slower development of late-successional forest conditions. 	<ul style="list-style-type: none"> Faster development of late-successional forest conditions on 347 acres treated. Girdling of trees provides a sustained pulse of snags/CWD.
Road Density								
Road density within Elk Creek Watershed	<ul style="list-style-type: none"> 4.7 miles per square mile. 	<ul style="list-style-type: none"> 4.5 miles per square mile. 	<ul style="list-style-type: none"> 4.4 miles per square mile. 	<ul style="list-style-type: none"> 4.4 miles per square mile. 	<ul style="list-style-type: none"> 4.4 miles per square mile. 	<ul style="list-style-type: none"> 4.3 miles per square mile. 	<ul style="list-style-type: none"> 4.5 miles per square mile. 	<ul style="list-style-type: none"> 4.4 miles per square mile.
Road density on BLM-administered land	<ul style="list-style-type: none"> 4.3 miles per square mile. 	<ul style="list-style-type: none"> 3.4 miles per square mile. 	<ul style="list-style-type: none"> 3.4 miles per square mile. 	<ul style="list-style-type: none"> 3.4 miles per square mile. 	<ul style="list-style-type: none"> 3.4 miles per square mile. 	<ul style="list-style-type: none"> 3.1 miles per square mile. 	<ul style="list-style-type: none"> 3.8 miles per square mile. 	<ul style="list-style-type: none"> 3.4 miles per square mile.
Percent decrease BLM road miles		<ul style="list-style-type: none"> 23% 	<ul style="list-style-type: none"> 23% 	<ul style="list-style-type: none"> 23% 	<ul style="list-style-type: none"> 23% 	<ul style="list-style-type: none"> 27% 	<ul style="list-style-type: none"> 10% 	<ul style="list-style-type: none"> 23%

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	Soils	Soils	Soils	Soils	Soils	Soils	Soils
Erosion: Salvage effect primarily caused by type of logging system employed (%) is area affected): • Tractor; 12% • Bull-line; 12% • Skyline; 5% • Helicopter; 4%	• No effect.	• No effect.	• Increased sediment relative to acres salvaged and yarding system used: ▪ Tractor 879 acres. ▪ Bull-line 1,078 acres. ▪ Skyline 267 acres. ▪ Helicopter 412 acres.	• Increased sediment relative to acres salvaged and yarding system used: ▪ Tractor 1,425 acres. ▪ Bull-line 1,064 acres. ▪ Skyline 512 acres. ▪ Helicopter 642 acres.	• Increased sediment relative to acres salvaged and yarding system used: ▪ Tractor 4,342 acres. ▪ Bull-line 536 acres. ▪ Skyline 1,090 acres. ▪ Helicopter 2,628 acres.	• Increased sediment relative to acres salvaged and yarding system used: ▪ Tractor 1,395 acres. ▪ Bull-line 0 acres. ▪ Skyline 46 acres. ▪ Helicopter 122 acres.	• Increased sediment relative to acres salvaged and yarding system used: ▪ Tractor 1,888 acres. ▪ Bull-line 1,051 acres. ▪ Skyline 338 acres. ▪ Helicopter 984 acres.
Soil compaction	• No effect.	• No effect.	• Increased compaction and soil displacement. • Maximum of 12% on 173 acres.	• Increased compaction and soil displacement. • Maximum of 12% on 237 acres.	• Increased compaction and soil displacement. • Maximum of 12% on 403 acres.	• Increased compaction and soil displacement. • Maximum of 12% on 29 acres.	• Increased compaction and soil displacement. • Maximum of 12% on 220 acres.
Soil Productivity	• No effect.	• No effect.	• Slight long-term adverse from removing some organic matter from 1,957 acres.	• Slight long-term adverse from removing some organic matter from 2,489 acres	• Slight long-term adverse from removing some organic matter from 4,878 acres	• Slight long-term adverse from removing some organic matter from 1,395 acres	• Slight long-term adverse from removing some organic matter from 2,939 acres

Delivery of Sediment to Streams						
Road decommissioning: reduces sediment delivery by 80-100% on treated road miles.	<ul style="list-style-type: none"> No roads decommissioned Continue existing erosion rates from roads. 	<ul style="list-style-type: none"> Potential short-term increase in delivery to streams followed by long-term reduction on 36 miles. decommissioned. Return 144 acres to natural forest condition. Removal of 133 stream crossings reduces annual road mass wasting rate by 8% 	<ul style="list-style-type: none"> Potential short-term increase in delivery to streams followed by long-term reduction on 36 miles. decommissioned. Return 144 acres to natural forest condition. Removal of 133 stream crossings reduces annual road mass wasting rate by 8% 	<ul style="list-style-type: none"> Potential short-term increase in delivery to streams followed by long-term reduction on 43 miles. decommissioned. Return 172 acres to natural forest condition. Removal of 148 stream crossings reduces annual road mass wasting rate by 9% 	<ul style="list-style-type: none"> Potential short-term increase in delivery to streams followed by long-term reduction on 17 miles. decommissioned. Return 68 acres to natural forest condition. Removal of 55 stream crossings reduces annual road mass wasting rate by 3% 	<ul style="list-style-type: none"> Potential short-term increase in delivery to streams followed by long-term reduction on 36 miles. decommissioned. Return 144 acres to natural forest condition. Removal of 133 stream crossings reduces annual road mass wasting rate by 8%
Road maintenance – reduces sediment delivery by about 46% on treated road miles.	<ul style="list-style-type: none"> Continued erosion rates from roads. 	<ul style="list-style-type: none"> Treat 77 miles. 	<ul style="list-style-type: none"> Treat 77 miles. 	<ul style="list-style-type: none"> Treat 115 miles. 	<ul style="list-style-type: none"> Treat 68 miles 	<ul style="list-style-type: none"> Treat 77 miles.
Stream crossing upgrades.	<ul style="list-style-type: none"> No upgrades. 13% increase in annual road mass wasting rate. 	<ul style="list-style-type: none"> Upgrade 15 high risk sites containing 11,000 yd³ of sediment. 13% decrease in annual road mass wasting rate. 	<ul style="list-style-type: none"> Upgrade 11 sites containing 8,000 yd³ of sediment. 16% decrease in annual road mass wasting rate. 	<ul style="list-style-type: none"> Upgrade 26 sites containing 19,000 yd³ of sediment. 22% decrease in annual road mass wasting rate. 	<ul style="list-style-type: none"> Upgrade 26 high risk sites containing 19,000 yd³ of sediment. 13% decrease in annual road mass wasting rate. 	<ul style="list-style-type: none"> Upgrade 11 sites containing 8,000 yd³ of sediment. 16% decrease in annual road mass wasting rate.
Seasonal closures of 114 miles of road	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> None. 	<ul style="list-style-type: none"> Reduce sediment delivery to streams, road damage, and disturbance to big game.

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Threatened or Endangered Species							
Northern Spotted Owl							
Salvage: Assume occupancy in 9 sites.	<ul style="list-style-type: none">No change.	<ul style="list-style-type: none">No change.	<ul style="list-style-type: none">No salvage within ¼ mile. Potentially could salvage 40 acres within ½ mile radius.Lowest risk of adverse impact.	<ul style="list-style-type: none">No salvage within ¼ mile. Salvage 111 acres within ½ mile of 8 sites.Low risk of adverse impacts.	<ul style="list-style-type: none">Enters units <10 acres and areas with >40% canopy.Degrades suitable habitat.Enters all 9 sites; 219 acres within ¼ mile and 826 acres within ½ mile.High risk of adverse impacts.	<ul style="list-style-type: none">Enters units <10 acres in size, but none within ¼ mile radius.Enter 6 sites and 40 acres within ½ mile.Degrades suitable habitat.Moderate risk of adverse impacts.	<ul style="list-style-type: none">Enter 49 acres within ¼ mile in research units and 281 acres within ½ miles radius of 8 sites.Moderate risk of adverse impacts.
Salvage: Assume no occupancy in 10 sites. Salvage within both ¼- and ½-mile radius of owl activity center.	<ul style="list-style-type: none">No change.	<ul style="list-style-type: none">No change.	<ul style="list-style-type: none">Enters 4 sites covering 109 acres at ¼ mile and 6 sites covering 221 acres at ½ mile.Lowest risk of adverse effect.	<ul style="list-style-type: none">Enters 4 sites covering 125 acres at ¼ mile and 9 sites covering 314 acres at ½ mile.Low risk of adverse effect.	<ul style="list-style-type: none">Enters units <10 acres and areas with >40% canopy degrades suitable habitat.Enters 9 sites covering 240 acres at ¼ mile and 10 sites covering 672 acres at ½ mileHighest risk of adverse effect.	<ul style="list-style-type: none">Enters units <10 acres in size degrading suitable habitat.Enters 5 sites covering 24 acres at ¼ mile and 8 sites covering 70 acres at ½ mileModerate risk of adverse effect.	<ul style="list-style-type: none">Enters 188 acres within ¼ mile of 8 sites and 462 acres at 9 sites within ½ mile radius.Moderate risk of adverse effect.

Restoration	<ul style="list-style-type: none"> • No beneficial effects from thinnings or habitat improvements. • No adverse effect. 	<ul style="list-style-type: none"> • 1,300 acre FMZ. • Low short-term adverse effect modifying suitable habitat. • Moderate long-term benefit protecting habitat. <p>Thinnings</p> <ul style="list-style-type: none"> • Accelerate development of late-successional habitat on 1,704 acres. • Moderate long-term beneficial effect. 	<ul style="list-style-type: none"> • 1,300 acre FMZ. • Low short-term adverse effect modifying suitable habitat. • Moderate long-term benefit protecting habitat. <p>Thinnings</p> <ul style="list-style-type: none"> • Accelerate development of late-successional habitat on 1,560 acres. • Moderate long-term beneficial effect. 	<ul style="list-style-type: none"> • 1,300 acre FMZ. • Low short-term adverse effect modifying suitable habitat. • Moderate long-term benefit protecting habitat. <p>Thinnings</p> <ul style="list-style-type: none"> • Accelerate development of late-successional habitat on 2,637 acres. • Moderate long-term beneficial effect. 	<ul style="list-style-type: none"> • 500 acre FMZ. • Inside fire, no short-term adverse effect modifying suitable habitat. • Low long-term benefit protecting future habitat. <p>Thinnings</p> <ul style="list-style-type: none"> • No beneficial effects from thinnings. • No adverse effect. 	<ul style="list-style-type: none"> • 1,300 acre FMZ. • Low short-term adverse effect modifying suitable habitat. • Moderate long-term benefit protecting habitat. <p>Thinnings</p> <ul style="list-style-type: none"> • Accelerate development of late-successional habitat on 1,560 acres. • Moderate long-term beneficial effect. 	<ul style="list-style-type: none"> • 1,300 acre FMZ. • Low short-term adverse effect modifying suitable habitat. • Moderate long-term benefit protecting habitat. <p>Thinnings</p> <ul style="list-style-type: none"> • Accelerate development of late-successional habitat on 1,560 acres. • Moderate long-term beneficial effect.
American Bald Eagle							
Restoration Eagle nesting habitat projects	<ul style="list-style-type: none"> • No change. 	<ul style="list-style-type: none"> • Future nesting habitat established at 2 sites (50 acres) • Could contribute to delisting. 	<ul style="list-style-type: none"> • Future nesting habitat established at 2 sites (50 acres) • Could contribute to delisting. 	<ul style="list-style-type: none"> • Future nesting habitat established at 2 sites (50 acres). • Could contribute to delisting. 	<ul style="list-style-type: none"> • No change. 	<ul style="list-style-type: none"> • Future nesting habitat established at 2 sites (50 acres) • Could contribute to de-listing. 	<ul style="list-style-type: none"> • Future nesting habitat established at 2 sites (50 acres) • Could contribute to de-listing.
Coho Salmon							
Salvage	<ul style="list-style-type: none"> • No salvage, no effect. 	<ul style="list-style-type: none"> • No salvage, no effect. 	<ul style="list-style-type: none"> • Insignificant/ discernible effect to fish and fish populations. • May effect, NLAA. 	<ul style="list-style-type: none"> • Insignificant/ discernible effect to fish and fish populations. • May effect, NLAA. 	<ul style="list-style-type: none"> • Insignificant/ discernible effect to fish and fish populations. • May effect, NLAA. 	<ul style="list-style-type: none"> • Insignificant/ discernible effect to fish and fish populations. • May effect, NLAA. 	<ul style="list-style-type: none"> • Insignificant/ discernible effect to fish and fish populations. • May effect, NLAA.

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Proposed Projects							
Restoration	<ul style="list-style-type: none"> No change; Substantial adverse effects May effect, LAA. 	<ul style="list-style-type: none"> Short-term adverse and low long-term beneficial effect May effect, NLAA. 	<ul style="list-style-type: none"> Short-term adverse and moderate long-term beneficial effect. May effect, NLAA. 	<ul style="list-style-type: none"> Short-term adverse and substantial long-term beneficial effect. May effect, NLAA. 	<ul style="list-style-type: none"> Short-term adverse and moderate long-term beneficial effect. May effect, NLAA. 	<ul style="list-style-type: none"> Short-term adverse and moderate long-term beneficial effect. May effect, NLAA. 	<ul style="list-style-type: none"> Short-term adverse and moderate long-term beneficial effect. May effect, NLAA.
Sensitive Species							
Cavity nesters: Salvage	<ul style="list-style-type: none"> No change 	<ul style="list-style-type: none"> No change. 	<ul style="list-style-type: none"> Negligible impacts (80-100% of snags remain). 	<ul style="list-style-type: none"> Very low impacts (manage for 80% and 50% tolerance levels). 	<ul style="list-style-type: none"> Moderate impact; Highest snag #s removed. 	<ul style="list-style-type: none"> Low impact (<2 acre patches and all burn outside green patches remain). 	<ul style="list-style-type: none"> Low impact (patches < 10 acres 100% snags remain; 8-12 snags/acre left in treated acres).
Late-Successional habitat associated species: Salvage	<ul style="list-style-type: none"> No impacts 	<ul style="list-style-type: none"> No impacts. 	<ul style="list-style-type: none"> Negligible effects to late-successional habitat. 	<ul style="list-style-type: none"> Negligible effects to late-successional habitat. 	<ul style="list-style-type: none"> Low to moderate effects due to adverse impact to late-successional stand development. 	<ul style="list-style-type: none"> Low due to adverse impact to late-successional stand development. 	<ul style="list-style-type: none"> Negligible effects to late-successional habitat.

Late-Successional habitat associated species: Restoration	• No change	• Slower development of late-successional habitat. • Low effects to species that would use dense understory in FMZs.	• Low short-term disturbance during activity. • Long-term benefit to species that use high canopy and open understory. • Low effects to species that would use dense understory in FMZs.	• Low short-term disturbance during activity. • High benefit to habitat development. • Low effects to species that would use dense understory in FMZs.	• Slower development of late-successional habitat. • Low effects to species that would use dense understory in FMZs.	• Low short-term disturbance during activity. • Long-term benefit to species that use high canopy and open understory. • Low effects to species that would use dense understory in FMZs.
Big game: road restoration	• No change in road density	• Potential increase in winter vehicle traffic from road restoration. • Decommission and closure of 36 miles of road reduces poaching and disturbance.	• Potential increase in winter vehicle traffic from road restoration. • Decommission and closure of 36 miles of road reduces poaching and disturbance.	• Potential increase in winter vehicle traffic from road restoration. • Decommission and closure of 43 miles of road reduces poaching and disturbance. • Reduces poaching and disturbance by seasonally closing 114 miles of road.	• Potential increase in winter vehicle traffic from road restoration. • Decommission and closure of 17 miles of road reduces poaching and disturbance.	• Potential increase in winter vehicle traffic from road restoration. • Decommission and closure of 36 miles of road reduces poaching and disturbance. • Reduces poaching and disturbance by seasonally closing 114 miles of road.
Special Status and Survey and Manage Plants (vascular and nonvascular)						
Salvage	• No change.	• No change.	• Slight negative effect from tractor harvest and temporary roads.	• Low adverse effect from tractor harvest and temporary roads.	• Moderate adverse effect from tractor harvest and temporary roads.	• Very slight negative effect from tractor harvest and temporary roads. • Low negative effect from tractor harvest and temporary roads.

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Table 2-2. Summary of the Effects of the Alternatives

		Alternative A No Action - Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSRA Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Restoration	Proposed Projects	<ul style="list-style-type: none"> No benefits from habitat enhancement projects. 	<ul style="list-style-type: none"> Low beneficial effects from habitat enhancement and fuels reduction projects. 	<ul style="list-style-type: none"> Moderate beneficial effects from habitat enhancement and fuels reduction projects. Slight risks from tractor harvest. 	<ul style="list-style-type: none"> Moderate beneficial effects from habitat enhancement and fuels reduction projects. Low risk from tractor harvest. 	<ul style="list-style-type: none"> High beneficial effects from habitat enhancement and fuels reduction projects. Moderate risk from tractor harvest. 	<ul style="list-style-type: none"> Low beneficial effects from habitat enhancement and fuels reduction projects. 	<ul style="list-style-type: none"> Moderate beneficial effects from habitat enhancement and fuels reduction projects. Low risk from tractor harvest.
Insect Outbreak								
Salvage		<ul style="list-style-type: none"> Wood borer; moderate to high increase. Bark beetle; low to moderate increase. 	<ul style="list-style-type: none"> Wood borer; moderate to high increase. Bark beetle; low to moderate increase. 	<ul style="list-style-type: none"> Wood borer; moderate to high increase. Bark beetle; low-moderate increase. 	<ul style="list-style-type: none"> Wood borer; moderate to high increase. Bark beetle; low-moderate increase. 	<ul style="list-style-type: none"> Wood borer; slight increase. Bark beetle; slight increase. 	<ul style="list-style-type: none"> Wood borer; moderate to high increase. Bark beetle; low-moderate increase. 	<ul style="list-style-type: none"> Wood borer; slight increase. Bark beetle; slight increase.
Restoration		<ul style="list-style-type: none"> Wood borer: No change. Bark beetle: slight increase. 	<ul style="list-style-type: none"> Wood borer: No change. Bark beetle: slight increase. 	<ul style="list-style-type: none"> Wood borer: slight increase. Bark beetle: slight increase. 	<ul style="list-style-type: none"> Wood borer: slight increase. Bark beetle: slight increase. 	<ul style="list-style-type: none"> Wood borer: slight increase. Bark beetle: low to moderate increase. 	<ul style="list-style-type: none"> Wood borer: No change. Bark beetle: slight increase. 	<ul style="list-style-type: none"> Wood borer: slight increase. Bark beetle: slight increase.
Noxious Weeds Populations								
Salvage		<ul style="list-style-type: none"> No increased risk of invasion. 	<ul style="list-style-type: none"> No increased risk of invasion. 	<ul style="list-style-type: none"> Increased risk of noxious weed establishment relative to disturbance and harvest systems. 	<ul style="list-style-type: none"> Increased risk of noxious weed establishment relative to disturbance and harvest systems. 	<ul style="list-style-type: none"> Increased risk of noxious weed establishment relative to disturbance and harvest systems. 	<ul style="list-style-type: none"> Increased risk of noxious weed establishment relative to disturbance and harvest systems. 	<ul style="list-style-type: none"> Increased risk of noxious weed establishment relative to disturbance and harvest systems.

Restoration	Increased risk of noxious weed establishment relative to disturbance	Increased risk of noxious weed establishment relative to disturbance.	Increased risk of noxious weed establishment relative to disturbance.	Increased risk of noxious weed establishment relative to disturbance.	Increased risk of noxious weed establishment relative to disturbance.	Increased risk of noxious weed establishment relative to disturbance.
Public Safety						
Road side hazard tree removal	<ul style="list-style-type: none"> Potential hazards removed when identified. Higher risk to public. 	<ul style="list-style-type: none"> Potential hazard trees cut reduces risk to public. Salvage those cut. 	<ul style="list-style-type: none"> Potential hazard trees cut reduces risk to public. Salvage those cut. 	<ul style="list-style-type: none"> Potential hazard trees cut reduces risk to public. Salvage those cut. 	<ul style="list-style-type: none"> Potential hazard trees cut reduces risk to public. Salvage those cut. 	<ul style="list-style-type: none"> Potential hazard trees cut reduces risk to public. Salvage those cut.
Total area within fire perimeter with lower snag levels	<ul style="list-style-type: none"> 22% 	<ul style="list-style-type: none"> 24% 	<ul style="list-style-type: none"> 29% 	<ul style="list-style-type: none"> 49% 	<ul style="list-style-type: none"> 23% 	<ul style="list-style-type: none"> 33%
Consistency of Actions with NFP/RMP/LSRA						
Salvage: Consistency concerns related to <ul style="list-style-type: none"> 10-acre rule Salvage in areas with greater than 40% canopy Snags and CWD requirements Acres treated Research 	<ul style="list-style-type: none"> No salvage. 	<ul style="list-style-type: none"> Consistent with NFP, RMP, and LSRA with exemption for acres salvaged. 	<ul style="list-style-type: none"> Consistent with NFP, RMP, and LSRA with exemption for acres salvaged. 	<ul style="list-style-type: none"> Not consistent with NFP, RMP, or LSRA. Plan amendment required for: <ul style="list-style-type: none"> Salvage in stands with greater than 40% canopy Salvage stands less than 10 acres in size 	<ul style="list-style-type: none"> Not consistent with NFP, RMP, or LSRA. Plan amendment required for: <ul style="list-style-type: none"> Salvage stands less than 10 acres in size 	<ul style="list-style-type: none"> Research consistent with NFP. Consistent with NFP, RMP, and LSRA with exemption for acres salvaged.

Table 2-2. Summary of the Effects of the Alternatives

Table 2-2. Summary of the Effects of the Alternatives

Proposed Projects	Alternative A No Action - Continuation of Current Management	Alternative B No Salvage; Focused Restoration	Alternative C LSRA Salvage; Moderate Restoration	Alternative D LSRA Salvage with DecAID; Moderate Restoration	Alternative E High Salvage; Extensive Restoration	Alternative F Salvage based on Report by Beschta et al.; Focused Restoration in Fire Area Only	Alternative G Salvage based on Research; Moderate Restoration
Restoration: Consistency concerns related to <ul style="list-style-type: none"> FMZs Late-successional habitat enhancement Acres treated. 	<ul style="list-style-type: none"> Reforestation consistent with NFP and RMP. 	<ul style="list-style-type: none"> Treatments consistent with LSRA guidelines for FMZs and late-successional habitat enhancement. Consistent with NFP, RMP, and LSRA with exemption for acres treated. 	<ul style="list-style-type: none"> Treatments consistent with LSRA guidelines for FMZs and late-successional habitat enhancement. Consistent with NFP, RMP, and LSRA with exemption for acres treated. 	<ul style="list-style-type: none"> Treatments consistent with LSRA guidelines for FMZs and late-successional habitat enhancement. Consistent with NFP, RMP, and LSRA with exemption for acres treated. 	<ul style="list-style-type: none"> Treatments consistent with LSRA guidelines for FMZs and late-successional habitat enhancement. Consistent with NFP, RMP, and LSRA with exemption for acres treated. 	<ul style="list-style-type: none"> Treatments consistent with LSRA guidelines for FMZs and late-successional habitat enhancement. 	<ul style="list-style-type: none"> Treatments consistent with LSRA guidelines for FMZs and late-successional habitat enhancement. Consistent with NFP, RMP, and LSRA with exemption for acres treated.

Table 2-3 Cumulative Effects Analysis Summary

Issue	Past Actions	Timbered Rock Fire and Fire Suppression Actions	Proposed Actions Under the Preferred Alternative	Reasonable Foreseeable Future Actions	Cumulative Effects
Timber Management	<ul style="list-style-type: none"> • Checkerboard ownership pattern creates mosaic of seral stages. • Both industrial and public lands managed for timber production. • Numerous roads built to facilitate timber management. • Last timber sale on public lands was in late 1980s. • Public lands designated an LSR in 1994 and management focus switched to protecting or accelerating LSOG forest conditions. 	<ul style="list-style-type: none"> • Fire returned areas of high and moderate burn severity to early seral. • Areas burned with low or very low severity will return to pre-fire conditions within 2-10 years. 	<ul style="list-style-type: none"> • Public lands administered by BLM (and FS) managed for late-successional forest conditions consistent with NFP and Medford District RMP. 	<ul style="list-style-type: none"> • Industrial forestlands managed intensively at short rotations (approximately 80 years). • Public lands administered by BLM and FS managed to protect and/or enhance late-successional forest conditions within the Elk Creek Watershed. 	<ul style="list-style-type: none"> • In the long-term, public lands managed by BLM and FS provide for late-successional forest conditions. • Interspersed with BLM-administered lands are young and mid seral forest stands on industrial forestlands. • Public lands in adjacent forest watersheds managed as Matrix, emphasis on timber production.
Salvage	<ul style="list-style-type: none"> • Actions taken consistent with past management direction, leaving fewer snags or CWD compared to existing direction. 	<ul style="list-style-type: none"> • NA 	<ul style="list-style-type: none"> • Salvage actions undertaken consistent with established LSR guidelines. 	<ul style="list-style-type: none"> • Industrial forestlands salvaged consistent with OFPA guidelines. 	<ul style="list-style-type: none"> • Salvage actions undertaken consistent with established LSR guidelines • Industrial forestlands salvaged consistent with OFPA guidelines

Table 2-3 Cumulative Effects Analysis Summary

Issue	Past Actions	Timbered Rock Fire and Fire Suppression Actions	Proposed Actions Under the Preferred Alternative	Reasonable Foreseeable Future Actions	Cumulative Effects
Wildfires	<ul style="list-style-type: none"> • Fire suppression began about 1910. • Large fires include: 1910 Buzzard Rock Fire; 1910 Needle Rock Fire; 1971 Elk Horn Peak Fire; 1972 West Branch Fire; 1987 Burnt Peak Fire; 2002 Timbered Rock Fire. • Fuels treatments have started within the watershed. • Numerous small fires occurred and were suppressed. • Fire exclusion has increased biomass. 	<ul style="list-style-type: none"> • Fire reduced fuel loadings for the short term within fire perimeter. • Outside fire perimeter, fuel loading remains high. 	<ul style="list-style-type: none"> • Fuels treatments would reduce fuel loadings. • Proposed fuels treatments could potentially reduce large fire size into 5,000 to 7,000 acre blocks. • Outside fire area existing fuels treatments would be expanded. 	<ul style="list-style-type: none"> • Wildfires continue to occur. • Aggressive fire suppression will continue to occur based on proximity to private land. • Maintain fuels treatments to reduce ammiability. 	<ul style="list-style-type: none"> • Potential for major reburn will exist after 15 to 20 years. • FMZs and thinnings would increase fire fighter safety and enhance control efforts. • Short-term, fuel conditions are present for large fires to occur given favorable weather conditions. • Long-term, probability for large fires to occur would decrease. • Increased protection to Wildland Urban Interface.
Reforestation	<ul style="list-style-type: none"> • There were approximately 5,400 acres of conifer plantations on BLM-administered land within the watershed, 10-40 years old. 	<ul style="list-style-type: none"> • Most of the 1,800 acres of plantations within the fire were burned with the majority of the trees killed. 	<ul style="list-style-type: none"> • Plant with mixed species, approximately 3,100 acres of BLM-administered land that burned with hot or moderate severity. • On BLM-administered land, replanting would not take place unless stocking levels fall below 100 tpa. • Treating of competing vegetation would occur if stocking levels fell below 250 tpa. 	<ul style="list-style-type: none"> • On industrial forest land, planting conifers and use of herbicides would occur on most of the harvested areas consistent with OFPA. 	<ul style="list-style-type: none"> • Seed from cones on fire-killed trees could help regenerate seedlings. • Seed viability is questionable as the fire occurred before cone maturity. • Live trees will produce seed and help reforest burned areas, especially along edges of green stands. • Brush component would be higher.

CWD and Snags	<ul style="list-style-type: none"> • Exclusion of fire has allowed small diameter woody debris to increase. • Some large diameter downed wood and snags have been removed in past harvest. • Fire exclusion has altered natural decay processes. 	<ul style="list-style-type: none"> • Fire created more small diameter CWD than previously existed. • Large diameter wood and snags was created by the fire. 	<ul style="list-style-type: none"> • Retains most small diameter trees killed in the fire. • Retains 6 tpa in research units and 8-12 large diameter snags per acre outside of research units. • Meets or exceeds snag and coarse woody debris retention levels suggested by DecAID wood advisor at the 30% and 50% levels. • In Riparian Reserves, loss of future CWD on 14 acres harvested in research units. 	<ul style="list-style-type: none"> • Harvest of up to 6,000 acres of private industrial forest land killed by the fire. 	<ul style="list-style-type: none"> • Reduction in CWD and snag levels on private timberland consistent with OFPA. • Retention of snags and CWD on BLM-administered land consistent with levels suggested by DecAID wood advisor. • Most fire-killed trees under 16" DBH not merchantable and retained.
LSR Habitat	<ul style="list-style-type: none"> • Late-successional habitat replaced by early seral conditions due to past fires and human activities. • Late-successional forest conditions beginning to return on public lands due to LSR designation. 	<ul style="list-style-type: none"> • Loss of late-successional forest conditions. • Increased late-successional forest habitat fragmentation. 	<ul style="list-style-type: none"> • FMZs provide increased protection to remaining late-successional habitat, but reduce canopy cover. • Thinnings and pine release accelerate development of late-successional forest conditions. 	<ul style="list-style-type: none"> • Management actions in adjacent watersheds and on BLM and FS Matrix lands reduce late-successional habitat. • FMZs maintained with open understory. • Late-successional habitat conditions improve in riparian reserves, owl cores, and in LSRs. • Silvicultural treatments applied to young and mid seral stands to accelerate late-successional forest conditions. 	<ul style="list-style-type: none"> • Checkerboard ownership pattern continues fragmentation of LSR habitat on landscape basis. • Adjacent watersheds provide late-successional habitat through riparian reserves and owl cores for dispersal. • Late-successional habitat conditions improve in the long-term within the Elk Creek LSR.

Table 2-3. Cumulative Effects Analysis Summary

Table 2-3 Cumulative Effects Analysis Summary

Issue	Past Actions	Timbered Rock Fire and Fire Suppression Actions	Proposed Actions Under the Preferred Alternative	Reasonable Foreseeable Future Actions	Cumulative Effects
Special Habitat: Riparian Vegetation	<ul style="list-style-type: none"> • More early and mid-seral riparian vegetation due to past timber harvest. • Reduced species and structural diversity in plantations due to even-spaced planting and thinning. • Fuels build-up due to fire exclusion. 	<ul style="list-style-type: none"> • Loss of some late-successional riparian vegetation. • Minor amount of riparian vegetation cut along roads during fire suppression activities. 	<ul style="list-style-type: none"> • High burn severity riparian areas replanted with conifers and hardwoods. • Late-successional characteristics accelerated in early and mid-seral riparian stands. 	<ul style="list-style-type: none"> • Development of late-successional habitat accelerated in thinned riparian reserves. • Planting accelerates tree establishment in riparian areas that burned at high severity or were impacted during fire suppression activities. 	<ul style="list-style-type: none"> • Riparian vegetation improved on BLM-administered land, but at watershed-level riparian vegetation may not be functioning at optimal conditions due to checkerboard ownership.
Special Habitat: Oak Woodlands and Meadows	<ul style="list-style-type: none"> • Altered and loss of habitats due to past human activities. • Fuel build up and loss of fire-dependent native vegetation due to fire exclusion. 	<ul style="list-style-type: none"> • Some increased risk of exotic plant invasion due to fire suppression activities and in areas burned at high severity. • Fuel loads reduced and fire re-introduced in oak woodlands and meadows within the fire perimeter. 	<ul style="list-style-type: none"> • Oak woodlands and meadows inside and outside the fire perimeter restored and maintained. 	<ul style="list-style-type: none"> • Oak woodlands and meadows maintained on BLM-administered land • Wildfires likely to continue. 	<ul style="list-style-type: none"> • Oak woodlands and meadows more fire-resilient and maintained on BLM-administered land.
Special Status Plants	<ul style="list-style-type: none"> • Altered and loss of habitat and Special Status plant populations due to past human activities within this and adjacent watersheds. 	<ul style="list-style-type: none"> • Slight chance that Special Status plants impacted by fire suppression activities. • Some Special Status plants possibly impacted in high and moderate burn severity areas. • Decrease in habitat for late-successional associated species; increase for earlier seral species. 	<ul style="list-style-type: none"> • Special Status plant sites protected through pre-project surveys and protection measures. • Some potential competition from increases in noxious weeds. • Increased habitat diversity and accelerated late-successional conditions from habitat enhancement projects. 	<ul style="list-style-type: none"> • Continued logging and road building on private, potential increase in noxious weeds. 	<ul style="list-style-type: none"> • Habitat diversity and suitability for Special Status plants increased on BLM-administered land due to habitat enhancement projects and natural recovery.

Road Density	<ul style="list-style-type: none"> • Numerous roads created for agriculture, residential, and timber management purposes. • High road density within watershed. 	<ul style="list-style-type: none"> • Slight increase resulting from opening old roads previously closed 	<ul style="list-style-type: none"> • Road density decreases on BLM-administered land and within entire watershed. • Seasonal closures minimizes traffic during wet season. 	<ul style="list-style-type: none"> • Roads within Elk Creek valley bottom and major drainages remain. • Numerous roads on BLM and industrial forestland either closed, improved, or decommissioned. • Long-term maintenance decreases. 	<ul style="list-style-type: none"> • Total miles of road decreases. • Miles of natural surface roads in riparian areas decreases. • Long-term decrease as fewer roads needed for timber management on both public and industrial forestland.
Soil	<ul style="list-style-type: none"> • Large increase in erosion over natural background rates. • Recently decreased erosion rates with improved forest practices. 	<ul style="list-style-type: none"> • Soil disturbance from fire-line construction. • Fire related erosion greatly increased. • Severe reduction in soil organisms in high burn severity areas. 	<ul style="list-style-type: none"> • Decreased road related erosion. • Moderate short-term increased erosion from salvage. • Maximum 12 percent compaction and displacement from tractor yarded acres. • 158 acres returned to vegetation from decommissioned roads. 	<ul style="list-style-type: none"> • Decrease erosion as fire area is revegetated. 	<ul style="list-style-type: none"> • Moderate short-term increase in erosion rates. • Reduced soil productivity from loss of organic material due to fire and whole tree yarding. • Slight long-term negative effect to soil productivity within fire area on BLM-administered land. • Beneficial effect in areas underburned due to increased nutrient availability. • Short-term benefit to productivity from immediate input of tops, limbs, sawdust.

Table 2-3. Cumulative Effects Analysis Summary

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Issue	Past Actions	Timbered Rock Fire and Fire Suppression Actions	Proposed Actions Under the Preferred Alternative	Reasonable Foreseeable Future Actions	Cumulative Effects
Delivery of Sediment to Streams	<ul style="list-style-type: none"> Increased over background levels due to road building and logging. Roads are the major source of sediment. 	<ul style="list-style-type: none"> Due to the fire, measurable increase over pre-fire levels during first year with levels tapering off each consecutive year as vegetation recovers. 	<ul style="list-style-type: none"> Slight increase above existing condition from salvage and road related projects. Large reduction of fine sediment delivery from some roads. 	<ul style="list-style-type: none"> Road restoration actions on BLM-administered land would reduce sediment delivery. Seasonal road closures on public and industrial forestland would reduce sediment delivery. 	<ul style="list-style-type: none"> Increased above term from road building, logging, fire, suppression, salvage, and restoration. Decreased in long-term from road improvements, decommissioning, and closure, but still above background levels.
Stream Temperature	<ul style="list-style-type: none"> Increased over background levels due to agriculture, logging, and road building. 	<ul style="list-style-type: none"> Increased temperature from loss of some streamside canopy cover during fire. 	<ul style="list-style-type: none"> Actions protect and maintain stream buffers. 	<ul style="list-style-type: none"> Harvest on industrial forestland maintains stream buffers consistent with OFPA. Increase stream shading due to recovering riparian areas would reduce stream temperatures. 	<ul style="list-style-type: none"> Increased above background level from past actions and wildfire. Pre-fire temperature levels reached in long-term after vegetation recovers.
Mass Wasting	<ul style="list-style-type: none"> Increased substantially over background levels due to road building, logging, and wildfires. Roads constructed on mid-slope in steep terrain have the greatest failure rates. 	<ul style="list-style-type: none"> Will increase greatly over next 10 years within fire perimeter. Steep uplands and mid-slope roads in the high and moderate burn severity areas are at the highest risk. 	<ul style="list-style-type: none"> Focused restoration of at-risk roads would measurably reduce the incidence of mass wasting from roads on BLM lands. 	<ul style="list-style-type: none"> Likely to be an equal or greater number of potential events within the fire on industrial forest land as on BLM-administered land. Treat some road fills to reduce delivery of sediment to streams, but not all. 	<ul style="list-style-type: none"> May decrease to pre-fire levels after 10+ years from roads and uplands, however, could remain higher near roads due to reduced maintenance. Implementing the proposed road restoration action on BLM lands would decrease incidence of mass wasting along roads.

Coho Salmon	<ul style="list-style-type: none"> Removal of large woody debris resulted in low habitat complexity. 	<ul style="list-style-type: none"> Slight increase in LWD Continued low habitat complexity. 	<ul style="list-style-type: none"> Improved habitat complexity. 	<ul style="list-style-type: none"> Improved habitat complexity. 	<ul style="list-style-type: none"> Improved fish populations and habitat in the short-term. Substantial decrease of fine sediment in streams.
Northern Spotted Owl	<ul style="list-style-type: none"> Habitat on BLM and FS lands has been improving since LSR designation in 1994. Owl populations slightly declining due to habitat alteration. 	<ul style="list-style-type: none"> Major reduction in the amount of suitable habitat. Major reduction in the probability of successful nesting. 	<ul style="list-style-type: none"> Unknown level of use of burned stands by spotted owls. Unknown level of risk from salvaging dead stands within ½ mile of historic activity centers. Salvage would not alter existing suitable habitat. 	<ul style="list-style-type: none"> Harvest on intermingled industrial lands could have additional effects on foraging. Anticipate that 9 of 13 sites active pre-fire will remain occupied. 	<ul style="list-style-type: none"> Suitable habitat on Matrix lands in adjacent lands continue to be logged. Increase in suitable spotted owl habitat as LSR characteristics return over long period of time. Salvage on intermingled industrial lands could have additional effects. Owl cores and riparian reserves in adjacent watershed will provide connectivity between LSRs.
Insect Outbreak	<ul style="list-style-type: none"> Bark Beetle and wood borer populations were at endemic levels prior to fire. Populations have been cyclical with localized outbreaks associated with drought, windthrow, and fire in the past. 	<ul style="list-style-type: none"> The fire increased habitat for bark beetles, especially in fire-damaged trees and habitat for wood borers in fire-killed trees. 	<ul style="list-style-type: none"> Increase in Bark Beetle populations due to retaining fire-damaged green trees. Slight increase in wood borer populations due to retention of fire-killed trees. 	<ul style="list-style-type: none"> Fire-killed trees would be removed on approximately 6,000 acres of private industrial forest land reducing wood borer habitat on those acres. 	<ul style="list-style-type: none"> Wood borer populations would likely rise and remain higher than normal as long as downed trees remained sound. Bark beetle populations would rise in the first 2 years after the fire and likely infest adjacent green trees, but would be localized and decrease to more normal levels within 3-4 years.

Table 2-3. Cumulative Effects Analysis Summary

Table 2-3 Cumulative Effects Analysis Summary

Issue	Past Actions	Timbered Rock Fire and Fire Suppression Actions	Proposed Actions Under the Preferred Alternative	Reasonable Foreseeable Future Actions	Cumulative Effects
Spread of Noxious Weeds	<ul style="list-style-type: none"> Occur along roads in forested areas. 	<ul style="list-style-type: none"> Increase open areas and disturbance increases risk of invasion and spread. 	<ul style="list-style-type: none"> Increase risk of weed establishment relative to disturbance and harvest systems. 	<ul style="list-style-type: none"> Increase risk of establishment offset by greater awareness and control measures. 	<ul style="list-style-type: none"> Reduced risk of spread due to implementation of mitigating measures, pdf's, and increased public awareness of noxious weed problems. Reduced risk of spread due to reduced activities on LSR designated lands. Increase noxious weed treatments on private lands reduces potential for spread